IN THE

SUPREME COURT OF THE UNITED STATES

October Term, 1975

No. 74-1033

C. MARSHALL DANN,
COMMISSIONER OF PATENTS AND TRADEMARKS,
Petitioner

v.

THOMAS R. JOHNSTON,
Respondent

BRIEF FOR THE RESPONDENT

On Writ of Certiorari to the
United States Court of Customs and Patent Appeals

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JURISDICTION

To the extent *certiorari* lies in matters of patent administrative litigation, this Court's jurisdiction rests on 28 U.S.C. §1256 as limited by 35 U.S.C. §141, *et seq*. Petitioner is jurisdictionally barred from reviving Examiner's "new use" rejection which was overruled by the Patent Board of Appeals. *See* Section I of the Argument.

QUESTIONS PRESENTED

1. Whether in matters of patent administrative litigation, this Court's *certiorari* jurisdiction under 28 U.S.C. §1256 is limited by 35 U.S.C. §141, *et seq*.

2. Whether Petitioner is jurisdictionally barred from raising the "new use" rejection which was overruled by the Board of Appeals and was neither appealed to nor argued before the Court of Customs and Patent Appeals.

3. Whether in the absence of a specific congressional exclusion, a special-purpose computer machine can be excluded from the general class of machines constituting statutory matters under 35 U.S.C. §101 by reason of its construction with software rather than hardware for its programming element.

4. Whether the Patent Office denial of patents for "softwire" embodiments of special-purpose computers while granting patents to "hardwire" embodiments is a denial of equal protection of the patent laws.

5. Whether an automatic record-keeping machine for all types of small-volume users (*e.g.*, merchants, professionals, farmers) that enables each to use an individualistic record-keeping format and bookkeeping procedure, and that employs, *inter alia*, a general control for directing the processing operations that are common to most users, which control interacts with and is directed by a master control located in the data files for directing the operations that vary with each user, is an unobvious improvement over the prior art.

STATEMENT

Respondent's invention[1] as described in his patent application is a "machine system for automatic record-keeping of bank checks and deposits," and is concerned with automating by means of a special-purpose computer the widely-varied financial record-keeping required by small-volume users.

The Machine Problem to be Solved.

The Government and large companies employ electronic computers for processing masses of financial data by performing vast numbers of elementary arithmetic operations. A requisite of efficient use of the large-scale computer facilities is that the accounting procedures and ledger formats of such a large-scale user[2] be uniform so that a single special-purpose computer (usually built by programming a general-purpose computer) can handle all of the data processing.

In contrast, low-volume users (*e.g.*, merchants, professionals, farmers) have been prevented from obtaining similar benefit of such computers because the wide variations in the ledger formats and bookkeeping and accounting procedures could not be accommodated by prior art special-purpose computers capable of handling only a single record-keeping format and procedure.

Any single special-purpose computer based on the prior art that would attempt to handle the wide variations in format among small-volume users in addition to being

1. The assignee of the invention is a small company, Rec-Chek, Inc. of Nevada, Iowa, with fewer than ten employees, which has been developing and marketing this invention for several years.

2. An example of a record-keeping system for large-scale users is described in the prior art patent to Dirks (A. 94-106); "A." refers to the printed Appendix; "Pet." refers to the Petition for a Writ of Certiorari; "Br. Pet." to Brief for Petitioner; "R. Br." to Reply Brief for Petitioner, "Br." plus the name of the *amicus* to the Brief thereof.

prohibitively expensive would have other serious drawbacks, since it would require a separate program (in effect, a separate special-purpose computer) for each user. Such a prior art special-purpose computer would not be able easily to accommodate users' needs to make changes or corrections in their formats or procedures, nor would it be able to add new users without difficulty.[3]

The Machine Solution

Respondent recognized that what was needed was a single special-purpose machine which could operate with and accommodate and flexibly adapt to all of the variations in ledger formats and bookkeeping methods that exist.

Respondent devised such a single special-purpose computer (A. 7, 68-9, Figs. 1A, B)[4]. The input to respondent's machine is in the form of all of the checks (A. 72, Fig. 4) and deposit slips of each user, and the output is a completely individualized and updated summary ledger (A. 83, 72; Figs. 11, 12) for each user. Its circuitry is structured to provide the flexibility to accommodate the wide variety presented by a large number of small-volume users so that efficient and economic computerized record-keeping is achieved.

This result is attained by the unique configuration of controls which is at the heart of respondent's invention, as the Court below found (Pet. 5A):

3. It is important to note that these drawbacks would exist whichever one of two alternative modes of computer construction was used, whether built entirely of computer circuitry or constructed by programming the circuitry of a general-purpose computer.

4. The description in the patent application, in accord with 35 U.S.C. §112, 1st para., is in such "terms as to enable any person skilled in the art to which it pertains . . . to make and use the same." The references to the patent application in the Appendix are to relevant portions which set forth more detailed descriptions of the invention.

> The control system . . . [of the special-purpose computer comprises] a general control which is applicable to the processing operations that are common to most [users] and a master control for the operations that vary on an individual basis with each [user]. The general control, as allegedly reduced to practice, is in the form of a software program and the master control is a series of subfiles, one for each [user], which are in the form of a sequence of records containing suitable control mechanisms and the [user's] financial data.

The master control mechanisms of each user's sub-file-circuits (A. 73, Fig. 5) interact with and cooperate with the slave or general controls (A. 74-82; Figs. 6-9) to direct the computer circuitry to perform each user's record-keeping according to the user's own bookkeeping or accounting procedure and in his own format.

Inputs to the machine are combinations of signals representing the transaction data in checks and deposit slips, as well as other financial data of the user. Additional inputs are combinations of electrical control signals that represent the format of each user's financial ledger. The format control signals are stored together with the data signals and can be handled in the same way and with the same ease as data signals. It is these format signals which include the "master control" and it is the fact that they are stored with and manipulated like data that gives the invention the unique flexibility described above.

The signals of the slave control, on the other hand, reside permanently in the memory; they remain the same while the machine processes each user's account. The various functional circuits of the computer are structured by the combined action of the slave control signals and the different ledger control signals (master control) for each user. Only one general or slave control program is employed to function interdependently and in common with all of the different ledger format signals and with the computer's functional circuits. In addition, the slave control includes other general control signals that operate the computer's functional circuits, directing the performance of record-keeping operations such as sorting transactions, sub-totalizing and totalizing.

More specifically, the master file circuits in memory (A. 17-21, 68, 69, 73; Figs. 1A-B, 5C-E) consist of each user's sub-file circuits (A. 73, Figs. 5C-E) whose states can be modified by having control signals and signals for ledger information inserted or removed as though they were data. Each user's sub-file is a set of record circuits, formed as a mix of three parts. One part 164, 167, 170, 171[5] of these record circuits stores the control signals for the format and bookkeeping method of a particular user's ledger. A second part 161, 163, 165, 166, 168, 169 stores other signals representing distinctive ledger information, which signals are used by the machine in composing and printing out the updated ledger in the user's individual format. The third part 168, 169 of these record circuits stores the signals for that user's financial data.

A user's complete ledger format and bookkeeping method and the financial data associated with each portion of the format are stored as combinations of electrical signals in circuits of the user's sub-file Fig. 5C. Thus, the sub-files contain all of the signals for the format variations from one user to the next. A first user's sub-file contains the control signals of a first master ledger format and the associated data signals, followed by a second user's sub-file containing the signals of a second master ledger format and data, and so on for a third and subsequent sub-files.

A special control program[6] Figs. 6-9 structures the computer's functional circuits in accordance with each

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5. Reference numerals are those used in the patent application, reprinted in the previously identified figures and pages of the Appendix.

6. A simple bookkeeping algorithm such as in the prior art cannot be used, because each master sub-file contains a different ledger format with its individual mode of bookkeeping. Thus, the

user's different format control and identifier signals 164, 167, 170, 171 stored in his sub-file record circuits Figs. 5C-E. The functional circuits are configured in a specified way for processing each user's account in accordance with his ledger format and bookkeeping system. Slave controls (*e.g.*, Figs. 8C-D, 422-490, Figs. 9B, 556-578) adapt to the individual variations of the master control and identifier signals 164, 167, 170, 171 stored in each sub-file's record circuits, Fig. 5C.

In operation, the slave control directs the computer circuits to locate a particular user's master sub-file and to locate and identify each of the format control (identifier) signals in the user's sub-file. From the identification of the format control signals the circuits determine the type of record-keeping operations that are required for that user's ledger format. Upon identifying a particular type of operation (*i.e.*, whether a sub-total, a total, or a higher level total, and if a print-out is called for, what ledger information is to be printed out) the slave directs the computer circuits to perform the sequence of functions associated with that operation.

Respondent found that a small group of such signal codes,[7] can identify all of the different types of machine

Note 6—*Continued*

control program cannot be a fixed or invariable one which would handle only a single format. Similarly, a program with different fixed sub-programs built in to provide for all of the format variations would not have the flexibility of respondent's adaptive program, and would require the design of a new sub-program for each new user.

7. The identification codes, which are fundamental to the interaction between the two different parts of the control circuitry in the computer, are employed in association with other coded signals. The latter are category codes that operate with circuit mechanisms for interfacing the computer circuits on the input side with the user. These category code signals also are used to structure the output record form so that there is a consistent interface with the user at the output end of the machine also. Thereby, the machine is structured with mechanisms that insure that all of the

operations that are required for processing the almost unlimited variations that exist among users' ledgers. The slave control program construction adapts to all of these variations; that is, a multi-format construction is achieved with but a single adaptive control program and is therefore a single machine.[8] In addition, respondent's machine structure permits changes to be made in the *controls* for modifying the format or procedure for any small user or for additions of new users to the system, as easily as an error in data (*e.g.*, in an amount of a particular transaction) can be corrected.

The patent claims approved by the Court of Customs and Patent Appeals' decision below are directed to respondent's machine construction employing the aforementioned two-part control mechanism. All the claims specify the different locations of the two controls: (a) the master controls are in the data files so that they can be easily changed (*e.g.*, if a user's bookkeeping format changes or to add a user easily), and (b) the general slave controls permanently stored in memory that remain unchanged for

data is handled consistently, under program control, in accordance with the category codes (*i.e.*, dollars for oranges are added to other dollars for oranges and those for apples to others for apples). This construction is limited to handling financial accounts and for processing different ledger formats.

8. In contrast, the prior art machine systems referred to by the Patent Office consist of data files which are uniformly structured (which, therefore, could *not* contain the master format control information) and a single bookkeeping algorithm which repeatedly operates on each account's data in the exact same fashion. That is, the processing algorithm of the prior art has the single ledger format structure built into it. With this prior art arrangement, each user must walk to the same drummer. Thus, neither respondent's adaptive multi-format system nor any multi-format system is disclosed in the prior art. Moreover, if one wanted to extend the prior art system to handle different ledger formats, a different bookkeeping algorithm would have to be structured for each particular format. Therefore, the prior art would require a separate general control program for each format, and as a result, a multiplicity of individually constructed machines rather than a single machine as here.

all users, including the mechanisms ("means for identifying . . .") for assuring the proper co-action between the two sets of controls. The claims *per se* do not raise any issue of computer programs; they do not call for the use of a computer program in the construction of respondent's special-purpose computer, and they apply also to the wired computer-circuitry-version.[9]

Only machine claims were in the patent application as originally filed. These machine claims were rejected by the Examiner as improper in form under 35 U.S.C. §112 by reason of respondent's preferred construction with a general-purpose computer and a stored computer program, which the Examiner held was a "use for a known machine." (A. 88). Process claims were required by the Examiner instead. The Board of Appeals reversed this "use of a known machine" rejection, since it was clearly predicated on a lack of understanding of the technological facts of computers and computer programs. As the Board held (Pet. 28A):

> . . . an unprogrammed, or a differently programmed, general purpose computer is [not] the same machine as the one that would result from appellant's programming of the same or of a similar computer.

Simply put, a new program inserted in a general-purpose computer creates a new machine that incorporates, as one part, the machine of the general-purpose computer and, as another part, the computer program, which structures the circuits of the general-purpose computer into a certain configuration. In short, "the program restructures the computer," Flores, (1969) "Computer Software," *infra*.

9. Respondent's (A. 66-7) special-purpose computer is also disclosed for construction entirely by equivalent wired computer circuitry known to those skilled in the art, which version is a more costly one given the present state of the computer art and therefore not preferred.

After the "new use" issue was overruled by the Board, it did not arise again until petitioner sought to revive it in the Petition for a Writ of Certiorari before this Court. "New use" was not appealed to the C.C.P.A., and was not argued to nor considered in any way by that court. No evidence has ever been presented in the record about the computer technology to support the legal rejection of "new use." The record is barren of any explanation or rationale for the legal conclusion of "new use,"[10] except for what may be inferred from the above-quoted factual justification given by the Board for its refutation and overruling of the "new use" rejection.

The Examiner also rejected the claims as being "anticipated" by the prior art, *i.e.*, as not being directed to a "new machine" or a new process. This rejection was likewise reversed by the Board of Appeals. The Board entered its own "new rejection" of the claims: One rejection was under 35 U.S.C. §101 on the ground that the claims "would, in effect, grant a monopoly to [respondent] on a method of conducting the banking business since banks would thereby be restricted to the use of their data processing equipment only for their own bookkeeping and not being allowed to freely expand into the business of keeping books for their customers." (Pet. 33A-34A.) The Board also said of the claims (Pet. 27A) that they "are either to a method of bookkeeping . . . or to apparatus that automatically carries out . . . the steps of the bookkeeping method." The Board also entered a rejection under 35 U.S.C. §103 of the claims as obvious in view of the Dirks patent cited by the Examiner and also in view of a modified bank statement system suggested by the Board. The Board also entered two rejections under 35 U.S.C. §112 dealing with formal matters; these rejections have not been pursued here, though the petitioner quotes comments of the Board concerning these §112 rejections.

10. Even the Board was unsure of the rationale and noted what "appeared to be" the "bases for these rejections."

Thereafter, on appeal to the Court of Customs and Patent Appeals, respondent pursued only the original machine claims. Since the Board had reversed the Examiner on "use of a known machine" and confirmed respondent's right to define his invention as a "new machine," the process claims which had been filed at the instance of the Examiner were not pursued in the C.C.P.A. appeal. Respondent did not believe process claims defined the invention as appropriately as machine claims since the invention has as its nub the control mechanism formed as a combination of two specific parts and the specific location and interrelation of those parts. This control mechanism, respondent has always asserted, is part of a machine rather than a process.

The court below reversed all of the Board's rejections. As to the §101 rejection on "a method of doing business," the court held that the "appealed apparatus claims are not shown to cover either a method of doing business or even a method of bookkeeping." The Board's assertion that such a monopoly would ensue, the court said, was "misplaced." (Pet. 14A) "Obviously, banks would be free to . . . expand their services and use any apparatus that they may desire *except* the apparatus set forth in [respondent's] claims."

The court below held that the claimed "[r]ecord-keeping *machine* systems are clearly within the 'technological arts.' Such machine systems, which comprise programmed digital computers, are statutory subject matter," citing *In re Bernhart*, 417 F.2d 1395. The court also noted that the phrase "technological arts, . . . is synonymous with the phrase 'useful arts' as it appears in Article I, Section 8 of the Constitution." (Pet. 13A).

The C.C.P.A. also considered this Court's decision in *Benson*, which was handed down while that appeal was pending. The C.C.P.A. reverted to its decision in the earlier case of *In re Christensen*, 478 F.2d 1392 for its analysis of *Benson*. That case expressed the view of the C.C.P.A. that the issue considered by the Supreme Court in *Benson* was "a narrow one, namely, is a formula for . . . a series of

mathematical calculations a patentable *process*." Accordingly, the court below did not find the holding of *Benson* to be applicable to respondent's machine claims, which "do not claim or encompass a law of nature, a mathematical formula, or an algorithm." (Pet. 14A).

The court below dealt with the two obviousness rejections. As to the modification of the prior art proposed by the Board, the court held that modification as far as it goes "may possibly be obvious," but "further modification . . . in order to achieve the results of [respondent's] claimed apparatus, would not have been obvious to one of ordinary skill in the art who did not have appellant's specification before him." Pet. 15A. In short, the Board's proposed modification did not deal with a multi-format record-keeping machine and certainly not with an adaptive multi-format system produced by the co-acting "master control" and "general control." (Pet. 5A)

As to the rejection on the prior Dirks patent, the court below dismissed it out of hand: "The four brief portions of the Dirks specification referred to by the board and the additional passages of that specification" raised by the solicitor out of "509 pages" of Dirks in the record "simply are not suggestive of the subject matter of the appealed claims." (Pet. 14A)[11]

The court below rejected the Board's arguments on formal and related grounds and pointed out what should have been palpable: The automatic operation was achieved with "not a human being inside or outside [respondent's] apparatus," and that "the identifying operations" of the interacting general controls and master controls "are neither actually performed by a human being, nor can we imagine how they could be realistically performed by a human being. *See In re Bernhart, supra.*" (Pet. 13A)

Judge Rich, in his dissenting opinion below (as in a separate opinion in the earlier case of *In re Christensen, supra*) made it clear that he did not understand this Court's

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11. Judge Markey dissented on the grounds of obviousness.

reasoning in *Benson* and did not agree with its decision. He reaffirmed his belief in "the validity of this principle [that] a new program makes an old general purpose digital computer into a new and different machine." (Pet. 19A) Judge Rich found it significant to contemplate

> . . . the identities of the troops lined up for battle in *Benson* . . . against patenting programs for software, [namely] the collective forces of major hardware . . . manufacturers and their representative associations who, for economic reasons, did not want patents granted *on programs* for their machines.

Judge Rich explained in a recent article that in his opinion in this case he did "not abandon my personal beliefs about" the patentability of the programmed computer technology.[12]

SUMMARY OF ARGUMENT

Respondent has invented an automatic financial record-keeping machine with a unique structure that makes it possible for small-volume users (*e.g.*, merchants, professionals, farmers) to avail themselves of the data-processing facilities of a large-scale electronic computer. Respondent's machine processes the financial records of each user and produces a periodically updated ledger statement in the user's own bookkeeping format. The unique structure of respondent's invention consists of its having two different controls in different locations: a general control for all the machine operations common to most users, and a master control which resides in each user's data files and directs the general control to operate with all of the individual variations in the user's ledger format

12. Giles Sutherland Rich, "Change," 2 *APLA Quarterly Journal*, 214, 226 (1974).

and bookkeeping method. With that control structure, the machine adapts to each user's individual ledger format to process his financial records. None of the prior art cited by the Patent Office is concerned with the problem of constructing a machine to process records of small-volume users having a wide variety of ledger formats, nor with respondent's solution using the two different controls in that machine.

The basis for the Board's and C.C.P.A.'s findings below that respondent has invented a new machine different from an unprogrammed general-purpose computer is seen by consideration of the technological facts of programmed computers. A special-purpose computer is a hierarchical machine system built of basic electronic components which are combined to form logic circuits, which are, in turn, combined to form functional circuits. These functional circuits form a "storehouse of parts" that are themselves configured and sequenced by a program into a special-purpose computer, which is a more complex circuit configuration. The elements at each level serve as building blocks for the next level. In a fixed-wire computer, the logic and function circuits are "hardwired" in a permanent form into the desired configuration. However, in a general-purpose computer having a set of elementary function circuits, a "softwired" program, stored in the form of electronic states of the circuits, structures the function circuits into the desired configuration. Programming a general-purpose computer is like wiring a radio from individual transistors, resistors and other components. If the configuration is novel and unobvious, what has been built is a new machine, be it a radio or a special-purpose computer. It is for the resultant special-purpose machine structure constructed by either hardwire or softwire that respondent seeks patent protection.

Because the capability of a special-purpose computer is the same whether hardwired or softwired, these two forms of construction are engineering equivalents. One could build the same machine structure in hardware or

software, and the decision as to which mode of embodiment to employ depends on economic and technological trade-offs. With respect to the patent statutes, both forms of construction must be treated identically.

Petitioner's opposition to a patent for respondent's invention is based on its preferred mode of construction, namely, with a general-purpose computer and a stored program. The legal theory that it is "a new use for an existing machine," is not supported by any evidence and is but a superficial and inaccurate description of this complex technology. The general-purpose computer is an incomplete or unstructured machine serving as a "storehouse of parts" that is structured by the program. The special-purpose computer is not a "use" of the general-purpose computer but a "different machine," as both tribunals below have held; and the special-purpose computer is properly claimed as a new combination of circuits and electrical means under 35 U.S.C. §112.

The patent claims define a machine and not "a method of doing business" nor an "idea." Anyone would be free to perform similar data processing services for users by means of any other available machine except respondent's machine. The patent claims define a tangible structure and not an intangible process or "idea," nor is any method of bookkeeping or mathematics involved. None of the objections raised by the Court in *Benson, supra*, apply here.

The Commissioner's "new use" rejection in this case seeks to rebut the factual finding by the Board that respondent's invention is not the same machine as the general-purpose computer. That "new use" rejection was overruled by the Board of Appeals, which also affirmed the principle that programming a general-purpose computer restructures the computer so that it is a different machine. The Board also overruled the Examiner on his rejection that the claimed machine was not a new machine. The Commissioner of Patents, who is a member of the Board of Appeals, is bound by both its legal rulings and factual findings. The Commissioner could not and did not appeal to

the C.C.P.A. the Board of Appeals' ruling that the invention was not a "new use," and its "different machine" and "new machine" findings all of which were favorable to the respondent, and the Commissioner is jurisdictionally barred from raising those issues in this Court. 28 U.S.C. §1256, giving this Court jurisdiction over cases in the C.C.P.A., must be read in light of 35 U.S.C. §141, *et seq.* which limits the C.C.P.A.'s jurisdiction over appeals from the Board of Appeals to the review of only those issues decided adversely to the applicant. The C.C.P.A. thereby was without jurisdiction to review the "new-use" ruling and "different machine" and "new machine" findings which were favorable to the respondent. The Patent Office conceded that none of these issues were before the C.C.P.A. by its failure to argue them. Alternatively, if these issues were jurisdictionally before the C.C.P.A., the Patent Office's failure to raise them at that lower judicial level bars it from raising them here. Thus, the clear import of the statute and sound judicial principles dictate that the Commissioner is barred from raising these issues before this Court.

The equal protection guarantee mandates that the treatment of inventors of softwired special-purpose computers be equal to that accorded inventors of hardwired special-purpose computers or any other machine. Petitioner's classification of software inventions as unpatentable is so arbitrary and capricious as to be unconstitutional. All the evidence indicates and both tribunals below have found that software-built special-purpose computers are machines.

To single out the inventors of one class of machine for denial of patent protection is unconstitutional unless supported by some justification that is rationally related to the purposes of this statute. In this case there is no justification, nor could there be because hardware and software are equivalent forms of construction and hardwired special-purpose computers are conceded by all parties to be patentable. In addition, no rationale has ever been sug-

gested for denying patentability to one class of machines solely due to their mode of construction. Great injury has been caused respondent and the nation's interest in innovative software technology by reason of this irrational denial of the incentives of the patent system.

ARGUMENT

I. Petitioner is Jurisdictionally Barred from Contesting In this Appeal the Rulings of His Own Board of Appeals that Respondent's Invention Is Not a Use of an Old Machine but Is in Fact a Different and New Machine.

The heart of the petitioner's case is his characterization of respondent's invention as something other than a machine, namely, "new use of an existing machine."[13] The Board of Appeals overruled the Examiner's "same machine" premise[14], upon which his §112 "use" rejec-

13. *See* Br. Pet. 25-37. At various times, the Government asserts the invention is a "new use" 35 U.S.C. §100(b) (*id.* 30), an abstract idea or a business method (*id.* 20-24). Regardless of the various mischaracterizations, once it is apparent the claimed invention is in fact a machine, the patent statute classifies it as patentable subject matter (35 U.S.C. §101). In addition to the explicit command of the statute, the Equal Protection guarantee mandates the same result; *see* Section III, *infra*.

14. Pet. 28A. The Examiner made, *inter alia*, a specific rejection on the ground that "the claims are considered [by him] to be directed to a use for a known machine." Appendix, 88. The Patent Board of Appeals refused to sustain any of the Examiner's rejections finding them all to be interrelated and based upon the Examiner's invalid premise that a programmed computer is the same machine as an unprogrammed computer. Since the Examiner's §112 rejection of "use for a known machine" was not sustained by the Board it was never appealed to the C.C.P.A. and so is not in issue in this case as the Government concedes in its Brief, at 5, n. 5. The Government seeks to circumvent this fatal jurisdictional defect by extracting the "rationale" of the Examiner's ruling (Pet. Br. 33, n. 24) from the ruling itself and arguing that it has life here and

tion was based, as being contradicted by the facts of computer technology, and found that the invention is a machine structure because respondent's programming of a general-purpose computer restructures the latter into a different machine.[15] The petitioner, a member of the Board of Appeals, 35 U.S.C. §7, is bound by that ruling against the Examiner's "use" and "not a new machine" rejections and may not contest it in this Court.

In *Brenner v. Manson*, 383 U.S. 519, 523, n. 6, the Court noted that since the Board was the Commissioner's *alter ego*,[16] he was "appropriately bound by Board determinations." Similarly, the Court in *Glidden Co. v. Zdanok*, 370 U.S. 530, 580 (1962) recognized that:

> Like naturalization proceedings in a District Court, appeals from Patent Office decisions under 35 U.S.C. §144 are relatively summary—since the record is limited to the evidence allowed by that office—and are not themselves subject to direct review by appeal as of right. It was reasonable for Congress, therefore, to bind only the Patent Office on appeals, and to give private parties whether or not participants in such appeals a further opportunity to contest the

may be considered by this Court. The Examiner's erroneous "same machine" premise, which was rejected by both the Board and the C.C.P.A., is what led him to his equally erroneous conclusion that the claims were directed to "a use for a known machine."

15. Stating its agreement with the longstanding finding of the C.C.P.A. that programming such as respondent's does in fact restructure the computer into a different special-purpose machine, *see, e.g., Prater* and *Bernhart, infra*, the Board reversed the Examiner's rejection as being based on an invalid view of the technology that was used by respondent to build his machine. (Pet. 28A).

16. In fact, the Board is the supreme authority of the Patent Office as to matters that lie within its jurisdiction since the Commissioner may be outvoted by the other members of the Board if he exercises his *ex-officio* power to sit as a member of the Board. Furthermore, it is the Commissioner who is bound by Board determination and not vice-versa.

matter on plenary records developed in litigation elsewhere. This practice but furnishes a further illustration of the specialized jurisdiction of the Court of Customs and Patent Appeals, akin to that of the Commerce Court, in passing upon the consistency with law of expert administrative judgments without undertaking to conclude private parties in nonadministrative litigation.

This Court's *certiorari* jurisdiction over administrative litigation cases from the C.C.P.A. under 28 U.S.C. §1256 must be read in light of the clear intent of the Patent Code to insulate the Board of Appeals' findings favorable to the applicant from any judicial review. As *Glidden* points out, private parties have "a further opportunity to contest the matter on plenary records developed in litigation elsewhere." The fact that the Commissioner may petition for *certiorari* review of a C.C.P.A. decision, as *Brenner* held, does not in any way free him from being bound by rulings of the Board. To hold otherwise would be to permit the Commissioner to appeal from his own Patent Office rulings.

The patent statutes provide that only the applicant may appeal from an adverse decision by the Board, 35 U.S.C. §141, *et seq*. Accordingly, the Commissioner of Patents could not (and did not) raise the "new use," "not a different machine" and "not a new machine" issues in the C.C.P.A. and nowhere in that court's opinion are these matters touched upon.[17] The Commissioner is likewise barred from raising the "new use" issue here. This Court's

17. The C.C.P.A.'s jurisdictional statute 35 U.S.C. §144 states that "the decision shall be confined to the points set forth in the reasons of appeal." None of those points dealt with "new use," nor could they, for respondent was not "dissatisfied with the decision of the Board" (§141) in that respect and did not challenge that favorable aspect of the Board's decision. None of the challanged aspects had anything to do with "new use" or "the rationale of the examiner." The reasons of appeal dealt with the Board's rejections, not with its overruling of the examiner. None of the Board's rejections were in any way grounded on "new use." The Board's rejections did not raise the statutory section §100(b) dealing with "new use," nor did that section arise before the C.C.P.A.

The intervening *Benson* decision led to a full consideration of *Benson* before the C.C.P.A. But *Benson* did not discuss "new use," nor hold that a programmed computer was merely a "new use of an existing machine."

certiorari jurisdiction over cases in the C.C.P.A., 28 U.S.C. §1256, does not encompass what could not have been (and was not) before the C.C.P.A.[18]

The petitioner argues that when the C.C.P.A. reverses the Board on an issue, this Court should be able to review the C.C.P.A.'s reversal in light of the Examiner's rationale[19] as well as that of the Board (Br. Pet. 33, n. 24). That argument is irrelevant to this case because the C.C.P.A. did not reverse the Board on the "new use" issue; it did not have the issue before it and, indeed, was jurisdictionally barred from considering it.[20] Once the Board reversed the examiner and found that the programming of a general-purpose computer to implement respondent's invention

18. The situation is similar to that which arises when one party fails to cross-appeal from a lower court's resolution of a particular issue in a case. Without a cross-appeal this Court is bound to accept the unappealed findings of the tribunal below in deciding the other issues in the case. *See e.g., N.L.R.B. v. International Van Lines*, 409 U.S. 48, 52, n. 4 (unappealed finding that a strike was lawful is binding on the Court in determining whether employees have the right to be rehired). In this case, it is the statutory scheme rather than a failure to appeal which binds the Commissioner.

19. Apparently not content with challenging the Board's hitherto uncontested right to bind the Commissioner by its determination, the Commissioner seeks further to emasculate the Board by proposing that the Board's determinations do not even bind an Examiner. Indeed, the Commissioner would go so far as to exalt the "rationale" of an Examiner to a status above that of the decision-making power of the Board in a vain effort to establish a jurisdictional basis for the "new use" issue.

20. The jurisdictional barrier described in *Brenner* and *Glidden* is also recognized by the C.C.P.A. which notes that its jurisdiction "extends to and embraces none other than the adverse decision from which appellant has [taken an] appeal." *In re Melott*, 331 F.2d 887.

was not a "new use" of the computer but a different machine, the issue is not subject to further direct judicial review.[21]

Were petitioner permitted to bring up for review an issue that was not within the appellate conduit—the specific issues that are appealable and actually appealed to a higher tribunal—the entire patent appeal process would be impaired.

This patent application was originally filed with only machine claims including claims 20-24 which were found patentable by the C.C.P.A. The Examiner rejected (A. 88) those claims on "new use/old machine," holding that claims for a programmed general-purpose computer should be in process form only. Respondent opposed that rejection but added process claims in addition to the machine claims in order to satisfy the Examiner. However, the Examiner thereupon proceeded to reject all the claims by maintaining, *inter alia*, his "new use" rejection as to the machine claims and rejecting as "not new"[22] the process claims which he had solicited.

The Board of Appeals reversed all of the Examiner's rejections, and particularly that of "new use," on the ground that they were premised upon the Examiner's mistaken notion that an unprogrammed general-purpose computer" is the same machine" as respondent's programmed general-purpose computer, Pet. 28A. The Board then substituted its own "method of doing business" rejection on

21. Realizing that he is bound by Board determinations, the Commissioner attempts to portray his Board as not having ruled against "new use." This position betrays a key weakness in the Commissioner's argument. Assuming the Board did not conclusively decide in respondent's favor on "new use," the Commissioner could have pursued it before the C.C.P.A. Not having done so, the Commissioner has at the least waived his right to raise it here. However, to the contrary, the Board unequivocally overruled the Examiner on "new use" and every other rejection (Pet. 28A).

22. Apparently of the view that since the process would be performed by a general-purpose computer, it was not new. The tandem rejections of "new use" and "not new" are discussed below; *see* n. 37.

unstatutory subject matter, which rejection, in turn, was reversed by the C.C.P.A.[23] Only this specific Board rejection, together with that of obviousness,[24] which were before the C.C.P.A. for decision, are properly raised by the Commissioner before this Court.

Once the "new use" rejection was reversed by the Board, that issue was eliminated from the appellate conduit. Congress has given the applicant the exclusive right to appeal and legislated that all matters resolved in the applicant's favor at the Board level are conclusive against the Patent Office. Respondent, after his success before the Board, on the "new use" issue did not pursue the process claims before the C.C.P.A., and limited the appeal issues to the machine claims 20-24. In so doing, respondent relied on the fact that the Board of Appeals had made a final determination of the Patent Office position on the "new-use" issue as it applied to this case by rejecting it and replacing it with the technologically sound "different machine" finding. The judicial process requires the confidence of all litigants that matters finally resolved in a proceeding remain so.

This finality is important to an applicant receiving an adverse Board decision in making a choice between alternative appeal routes. Had the Board ruled in favor of the examiner on "new use" (*i.e.*, rejected the facts of computer restructuring) respondent could have availed himself of the District Court route, 35 U.S.C. §145 and built a fact record to rebut such an unfavorable Board determination. But the Board having agreed with the

23. The C.C.P.A. reversal of the Board's method of doing business rejection did not reinstate the so-called "new use" rejection by the Examiner. As noted *infra*, the C.C.P.A. has consistently rejected any attempt to equate programmed computers with "ideas." Even the Examiner's "new-use" rejection was not applied to the question of statutory subject matter, but solely to his §112 rejection relating to the formal and amendable question of "failing to point out and distinctly claim."

24. The Board rejections on formal grounds, 35 U.S.C. §112, have not been pursued here by the Patent Office.

technologically sound restructuring principle in overruling "new use" there were no factual issues requiring the establishment of a District Court record in support of respondent's position. That is why the respondent appealed to the C.C.P.A., where the appeal is determined "on the evidence produced before the Patent Office." 35 U.S.C. §144. This underscores the appropriateness and soundness of the appellate scheme of barring the Commissioner from raising (here as well as before the C.C.P.A.) legal (as well as factual) questions that were resolved favorably to respondent at the Board of Appeals.[25]

II. Respondent's Invention Is Patentable as a Machine.

A. Respondent's Invention Is A "New Machine."

The entire issue of patentable subject matter in this case is whether respondent has invented a "machine"[26] under 35 U.S.C. §101. Heretofore, any apparatus which operated automatically (that is, without human intervention) was clearly conceded to be a machine.[27] Respondent's invention is a machine on its face, for it achieves a unique end result without "a human being inside or outside [the] apparatus" (C.C.P.A. below, Pet. 13A).

Respondent's special-purpose computer automatically keeps records in different individual formats for a variety of different users. The claims define respondent's invention as a "combination of devices" (*Burr, supra*): *See* 35 U.S.C. §112, 3rd. para.

Petitioner denies the patentability of respondent's invention: a special-purpose computer which is preferably constructed with a stored program and a general-purpose computer. He concedes the physical changes produced by the stored program:

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25. On the other hand, there is no factual record here in support of petitioner's theory of "new use." The factual record in the present case, which consists only of respondent's patent application and the prior art cited by the Patent Office, is manifestly inadequate to support petitioner's position in the face of the findings by both tribunals below and the overwhelming technological evidence against it. The factual record developed by the Patent Office does not attempt to deal with the broad question of computer program patentability, and this Court would venture into deep water if it attempted to reverse the findings of the Patent Board of Appeals and the C.C.P.A. without a fully developed record, including the testimony of experts who had been subjected to cross-examination and a documentary history of the development of computer programming to date. (See Brief *amicus* of Los Angeles and Philadelphia Patent Law Associations, p. 8).

26. As the Court said in *Burr v. Duryee*, 68 U.S. 531, 570: "A machine is a concrete thing; consisting of parts, or of certain devices and combination of devices. The principle of a machine is properly defined to be . . . that peculiar combination of devices which distinguishes it from other machines."

Robinson on Patents, Vol. I, p. 257, §173, defines a machine as "an instrument composed of one or more of the mechanical powers, and capable, when set in motion, of producing, by its own operation, certain predetermined physical effects. It is an artificial rule of action, receiving crude mechanical force from the motive power, and . . . transforming . . . it according to the mode established by that rule."

A renowned computer scientist and Professor of Electrical Engineering at the Massachusetts Institute of Technology has given this definition: "When we talk about a machine we have in mind not only (1) an object of some sort, but (2) an idea of what that object is supposed to do. . . . One expects a machine to have a significant number of 'parts' and to perform some reasonably complex operation on something, but it is difficult to capture in the same definition machines which peel apples and machines which transform coded information signals!" Minsky, M. L., *Computation: Finite and Infinite Machines*, 1967, p. 3. This treatise presents a theoretical analysis of a programmed computer as a machine that is structured by the program; *see, e.g.*, at pp. 200-1.

27. Congress has never exluded any technology from the statutory classes nor from the class of machines with but one exception, the exclusion on atomic weapons 42 U.S.C. §2181a, and never on the mode of construction of a machine, which is the essence of the ruling requested herein by the Patent Office in violation of the clear proscription of 35 U.S.C. §103 that "Patentability shall not be negatived by the manner in which the invention was made."

> "the state or configuration of its circuitry [is] readily changed without rewiring or other visible physical changes, [which] changes are accomplished by the use of different 'programs' " (Br. Pet. 15).

But he nevertheless denies that the invention when so constructed can be claimed as a "machine" under 35 U.S.C. §101.

The Patent Office argues that respondent's invention is "a new use for an existing machine" (Br. Pet. 25) even though the patent claims define a machine structure quite different from that of the general-purpose computer and from any other "existing machine."[28] The Patent Office's argument is that the general-purpose computer is "existing," and a program is merely a "new use" of that general-purpose computer and, therefore, the invention must be defined as a *process*. This procrustean argument is but the first step in the Patent Office position which requires that all programmed computers must be cut or stretched into a uniform framework of "process." The remainder of the argument is the contention that all programs claimed as a process have been held by *Benson* to be abstract ideas and, therefore, unpatentable subject matter, even though the Court categorically stated: "We do not so hold." (*Benson, supra*, at 71.)

Unlike the *Benson* claims, the claims that were found patentable by the court below, are directed to a record-keeping machine for financial accounts, and not to a process, nor to an idea, nor to a mathematical formula or algorithm. Moreover, the claims are directed to tangible machinery having a particular configuration of master and

28. The statutory language of 35 U.S.C. §100(b) is that "a new use of a *known* . . . machine" (emphasis added) is a *process*. As is explained hereinafter, and as the Board of Appeals held below, the programmed computer does not fall within the statutory "new use of a known machine" concept. The Patent Office Brief does not explain what, if any, significance is to be attached to its use of the word "existing" instead of the word "known."

slave control mechanisms whose interrelationships are specifically defined, and also having a processor, a memory, and input and output devices. The claims thus are limited to a particular art and technology, to a machine composed of a particular construction of apparatus and to a particular end use. The only thing that would be patented by these claims is a particular machine, namely, a "configuration" (Br. Pet. 15) of electrical circuits. The same end use can be achieved with other machine constructions than that of the claims. Thus, these machine claims are totally different from and do not fall under the proscription of the "nutshell" and other criteria used in *Benson* to pass adversely on the patentability of the mathematical process in that case.

The Court in *Benson* dealt with the specific "mathematical formula" or "procedure" or "algorithm" before it and did not attempt to pass on the patentability of the entire technology of computer programs. Furthermore, there was no technological record on which such a decision could be grounded.[29]

The "new-use" argument of the Patent Office is directly contradicted by its own concession of the "possibility of

29. Compare the subsequent decision of the German counterpart of *Benson*, the only known case on patents for computer programs of the German Federal Patent Court, decided May 28, 1973, (4 CLSR 474). That German court, much as this Court in *Benson*, did not pass on the patentability of computer programs. That court said it "believes it is neither in a position, nor does it see a reason, to take a basic stand concerning the problem of patentability of computer programs [for the] prerequisite does not exist [of a] definition of the term 'computer program' binding in a patent law consideration."

The German Court also noted this Court's decision in *Benson*, but nonetheless held patentable a process claim which had clear machine limitations: "[T]here is no doubt as concerns the fact that the means used to carry out the process claimed are technical, namely, portions of a data processing apparatus. Since employing these means, as defined in detail in the characterizing method steps, is carried out independently, *i.e.*, without the assistance of a human being, no reservations exist also in this regard with respect to the technical nature of the invention. Finally, there is no doubt that the claimed process serves a technical purpose."

patentability" of software-embodied inventions[29a] and by the facts of the nature of programmed computers. These facts are made clear by (a) the computer experts, (b) the C.C.P.A. findings in other cases, (c) the Patent Office's own findings some years ago, and (d) the Board of Appeals' specific fact finding herein.[30] The computer experts explain the facts of the well-known "feature distinguishing the computer from other mechanisms . . . its restructurability . . . . The program restructures the computer.[31] The findings of fact as to this computer technology by the C.C.P.A. in a long line of cases up to the present[32] have held that a general-purpose computer is a "storehouse of parts":

> But once a program has been introduced, the general-purpose digital computer becomes a special-purpose digital computer (i.e., a specific electrical circuit . . . .)[33]

29a. R. Br. at 2.

30. Consistent with the C.C.P.A. decision herein is the most recently decided case before the Royal Courts of Justice, the Patents Appeal Tribunal of Great Britain. *In the Matter of THE APPLICATION OF BURROUGHS CORPORATION*, 1973, decided on an appeal of Burroughs Corporation, (a member of CBEMA) the Court held that the Applicant's invention "is embodied in the apparatus and programme described which has the effect of permanently controlling the whole system so that it operates in this particular way unless and until the programme is changed . . . T[I]n our view computer programmes which have the effect of controlling computers to operate in a particular way, where such programmes are embodied in physical form, are proper subject matter for letters patent." [citing *Slee & Harris' Applications* (1966 Reports of Patent Cases 194) and *Gever's Application* (1970 Reports of Patent Cases 91)].

31. Professor Ivan Flores, City University of New York "Computer Software," *Science & Technology*, No. 89, May, 1969, pp. 16, 17.

32. *In re Prater and Wei*, 415 F.2d 1393 (1969); *In re Bernhart*, 417 F.2d 1395 (1969); *In re Comstock*, 481 F.2d 905 (1973); *in re Knowlton*, 481 F.2d 1357 (1973).

33. *In re Prater*, *supra*, n. 29.

The special-purpose computer "is physically different from the machine without that program" and is patentable as a machine defined as a new combination of elements under 35 U.S.C. §112.[34] The Patent Office in its Guidelines for Examination of Computer Programs (1966),[35] written in part by members of the Patent Office Board of Appeals,[36] recognized that the stored program converts that " 'warehouse' of unrelated parts" of the general-purpose computer into a "special-purpose machine" which may be patented as "a novel and useful machine combination due to the interrelation of parts . . . and the fact that portions of the complete machine take the form of a replaceable program is of no moment."

In this case, the "new use" argument raised by the Patent Examiner to reject the machine claims, was reversed by the Board of Appeals as based on an *invalid factual premise*. The Board found (Pet. 28A):

> . . . that an unprogrammed, or a differently programmed, general-purpose computer is [not] the same machine as the one that would result from appellant's programming of the same or of a similar computer.

The Board used this same ground for reversing the Examiner's additional rejection under 35 U.S.C. §102 of the machine claims as "not new."[37]

34. In re *Bernhart*, *supra*, at 1400. Judge Rich in his opinion below reaffirmed "the validity of this principle [namely] a new program makes an old general purpose digital computer into a new and different machine" at the same time that he dissented so as to call for this *certiorari*, seeking thereby to cause a reexamination of the *Benson* decision. There has always been unanimity and no dissent in the court below on "the validity of this principle."

35. 829 O.G. 441, 442, by Order of Commissioner of Patents Brenner, August 9, 1966.

36. *See* Commissioner of Patents Brenner, "The Future of Computer Programs in the United States Patent Office," *Law of Software*, 1968, p. B-8.

37. The "new use" and "not new" rejections were employed in tandem in the Patent Office in the nature of a "catch-22". The "new

Thus, the Patent Office seeks to resuscitate herein the "new use" argument contrary to its own factual findings, those of the tribunals below and the computer experts.[38] Petitioner offers no supporting technological facts for his position, and relies on the legalisms of the "new use" theory to rebut the facts. The following discussion of the nature of the computer and stored-program technology is presented in order to assist the Court in understanding (a) the factual findings of the tribunals below that respondent's preferred embodiment of a programmed computer is a "different machine" and a "new machine" and (b) the legal

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Note 37—*Continued*

use" rejection was used by the Examiner to require the "process" claim format. Compliance with that requirement was followed by the "not new" rejection on the grounds that the process steps involved are those of the "existing" general-purpose computer. The Examiner and the petitioner, by treating the invention as a process, give no weight in the claims to the machine limitations to respondent's controls and their interrelationships and different physical locations. The "not new" rejection of the Examiner was made though the Patent Office has never suggested that any of the cited prior art machines operates in the same way, or produces the same end result or is constructed with the same controls.

38. This revival of the examiner's "new use" rejection, which was not and could not have been appealed to the C.C.P.A., is barred jurisdictionally as explained above in Section I. In addition, this Court has made clear that the concurrent findings by both tribunals below of the facts of a technology will not be reversed or questioned by this Court: in a "technical area [the Court] would not overturn the finding of the . . . Board of Appeals . . . not challenged by the C.C.P.A." *Brenner v. Manson, supra*, at 532. Furthermore, there is no factual record to support the Patent Office's argument seeking to justify its legal position. As the Court has stated: "Appeals from Patent Office decisions . . . are relatively summary—since the record is limited to the evidence allowed by that office. . . . It was . . . reasonable for Congress, therefore, to bind only the Patent Office on appeals and to give private parties . . . a further opportunity to contest the matter on *plenary records* developed in litigation elsewhere." *Glidden v. Zdanok*, 370 U.S. 530, 578-9 (1962).

conclusion of the Board that the respondent's invention is not a "new use" as petitioner argues.[39]

1. *Respondent's record-keeping machine system is a circuit configuration.*

Respondent's special-purpose computer is constructed as a configuration[40] of electrical components formed in "a specific electrical circuit."[41] This structure of respondent's machine (and of other machines implemented with a general-purpose digital computer and an internally-stored computer program) is illustrated in the accompanying diagram of the hierarchical structure of a special-purpose computer (*see* p. 30).

In this diagram, each level of the hierarchy,[42] supplies the building blocks out of which the circuits of the next level of the system[43] are built. The bottom level consists of electrical components from which the logic circuits of the next level are configured. The logic circuits are combined into the more complex building blocks—circuits called the "functional units"[44] of the general-purpose computer's processor.[45] These functional units,

39. Petitioner's attempt to have this Court determine by legal fiat and contrary to the facts, the nature of computers and computer programs brings to mind the declaration of the Court of the Special Inquisition that the sun rotated around the earth in the face of Galileo's evidence of a different structural relation of sun and earth; *see* J. Bronowski, *The Ascent of Man*, (1973) p. 213, *et seq.*

40. Defined in Br. Pet. 15, n. 13.

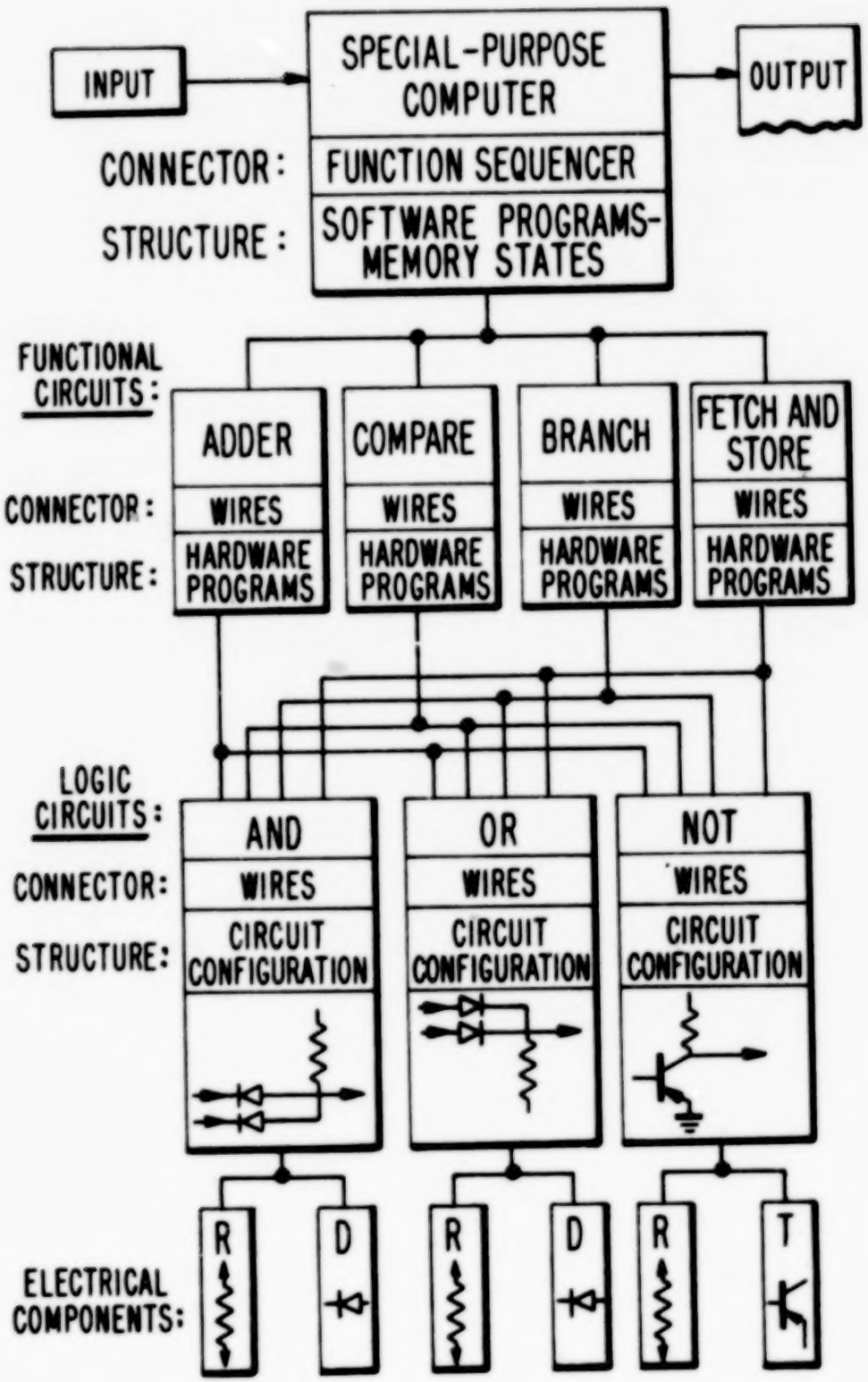
41. *In re Prater, supra.*, n. 29.

42. "*Hierarchy* . . . a rank arrangement in which the nature of function at each higher level becomes more broadly embracive than at the lower level." (A. Iberall, *Toward a General Science of Viable Systems*, McGraw-Hill, 1972, p. 388.

43. "*System*. A complex unity formed of many, often diverse, parts subject to a common plan or serving a common purpose. . . ." (Ibid. at p. 7).

44. Professor Ivan Flores, *Computer Logic: The Functional Design of Digital Computers*, (W. L. Everitt, Editor) Prentice-Hall, Inc., 1960, Chapter Eleven, "Functional Units," pp. 173-207.

45. And into the other circuits (*e.g.*, memory, sequencer control, input and output) that form the general-purpose computer. "The term *logic* . . . describes the interrelation among the primary building blocks of the computer." Flores, *ibid.*, p. 123.



in turn, are combined into the special-purpose computer (such as respondent's) which receives input signals (the checks and deposit slips) and produces output signals (the updated ledgers).

The electrical components, *e.g.*, resistors (R), diodes (D), transistors (T), at the bottom level[46] of the hierarchy are like those used in all modern electronic equipment (*e.g.*, in radar, television, radio, telephone, automation). These electrical components are combined in different circuit configurations to form logic circuits called AND, OR and NOT which transform electrical signals in a manner representative of their named logic operation.[47]

The logic circuits are structured at the next level into functional circuits (Adder, Compare, Fetch and Store and Branch or Conditional Transfer of Control). These functional circuits combine electrical signals in accordance with their named function. The Adder functions to add numbers represented by combinations of signals. Similarly, the Compare circuit operates to compare numbers for the relations of equality and "greater than" and "less than." Fetch and Store are control circuits for moving data signals to and from the memory, which is constructed from millions of flip-flop circuits, the basic storage units for the binary computer signals.[48]

The Branch or Conditional Transfer of Control performs a function unique to digital computers, whereby the sequence of functional circuits can be varied in accordance

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46. At a still lower level of this structional hierarchy, the molecular and atomic substructure of these components (such as the solid-state transistors and diodes) are important factors in their design and in their interrelationships at higher hierarchical levels.

47. The AND circuit produces an active output signal when all of the circuit's inputs are active; OR, when either one or another, or all of its inputs are active; NOT produces an active output when its input is not active. In place of three different types of logic circuits, many digital computers are built from combinations of a single such circuit, the NOR (the negative of OR; its output is active when neither of its inputs are active).

48. The flip-flop is also formed from the logic circuits.

with different *conditions* of the input or processed data. In a simple example, if a first number is greater than a second, one sequence of functional circuits is activated; but if second number is the greater, a different sequence is activated.[49]

A general-purpose computer is configured to have a basic "repertoire" of functional circuits (also called "instructions" or "orders").[50] The structural configuration of each of these functional, control and memory circuits is called "permanent programming"[51] or "hardware programming."[52]

Programs in the broader sense are part of all automatic machines, and automated systems. "*Program elements* determine *what* the automated system shall do and *how* the parts of the system must function in order to accomplish the desired result."[53]

"Software programming"[54] is the structure of the special-purpose computer which configures the functional circuits (Adder, Compare, Branch, etc.) to interconnect certain sequences of those circuits and combinations of

49. As explained in ADR Brief, *amicus curiae*, p. 11, *et seq.* this Branch control (or "Decision") is fundamental to the ability to structure a general-purpose computer into a special-purpose computer by means of software programming.

50. A more elaborate set (*e.g.*, to perform also subtraction, multiplication and division, shifting of numbers, etc.) is often used.

51. I. Flores, (1960), *supra*, p. 42.

52. Prof. Saul Rosen, "Hardware Design Reflecting Software Requirements," 33 *Proc. Fall Joint Computer Conference*, 1968, Pt. II, pp. 1443, 1444.

53. "The program may consist of mechanical parts such as gears, cams, and linkages that connect the various portions of a machine together and determine the timing of the various actions of the machine. In the most modern computer-controlled systems, the program may be stored in the form of punched paper cards, paper tape, magnetic tape, ferrite cores, electronic circuits, or other mechanical or electronic "memory" devices. 2 *New Encyclopedia Britannica: Macropaedia*, 505, 506, "Automation."

54. Term used herein for what is customarily called "computer programming" to avoid semantic confusion with hardware programming.

those sequences.[55] The software programming (the internally stored program) takes the physical form of combinations of different "states"[56] of the memory circuits and of electrical signals that control the states and configurations of the functional circuits.

Software programming resembles hardware programming in a number of respects, and most importantly in the way that lower-level building blocks are structured.[57] However, the connector used with the software for configuring the functional units is a different type from that of the hardware programming. Starting at the bottom level of the hierarchy the electrical components are connected together in the logic circuits by fixed wire or "hardwire" connectors.[58] The logic circuits are similarly hardwire connected into the functional circuits and other circuits of the general-purpose computer. However, at the top of the hierarchy, a "softwire" connector is employed for the software structure. This connector includes a function ("instruction") sequencer, which effectively interconnects the functional circuits in the sequences prescribed by the software programming.[59]

By forming the structure at the top of the hierarchy as electrical signals, that structure can be stored in the

55. Basic repetitive sequences are called "sub-routines." (Br. Pet. 15).

56. (Br. Pet. 15, n. 13).

57. The software and hardware programming are engineering equivalents, as discussed hereinafter.

58. "Hardwire" connections may be made by simply twisting or soldering wires together or in more advanced fabrication by printed circuits or integrated circuits; *see Scientific American* article, May, 1975, "Microprocessors."

59. The function sequencer activates by control signals the circuitry of the functional units at the appropriate times in sequences specified by the software programming. When activated the circuits are effectively "connected," and when inactive they are not. The engineer's term "softwire" refers to use of control signals for the connections. The sequencer, memory, input and output circuits are all part of the general-purpose computer; the control program is in the states of the memory circuits.

computer memory in the same way that other signals are stored. The ability to store the structure of a special-purpose computer in the form of electrical signals gives rise to the ability to replace one such structure by another simply by replacing one set of electrical signals (software program) by another. *This concept of the stored-program computer is the foundation on which the computer industry is built.*

Since the building blocks of each hierarchical level of such computers are nested within those of the next higher level as shown in the diagram, the special-purpose computer at the top level includes all of the elements and structural relations shown in the drawing. This special-purpose computer receives input signals and, within its circuits, combines them and modifies them to produce output signals. The combining and modifying is in accordance with the structure of the stored software programming, which uniquely establishes the "rule of action" of the special-purpose computer.

Respondent's special-purpose computer, in the same way, functions as "a specific electrical circuit"[60] configured out of sequences of functional circuits, which in turn are configured combinations of logic circuits, which in turn are configured combinations of circuit components.

2. The general-purpose computer is an incomplete machine that serves as "a storehouse of parts" and is completed by respondent's stored program to form a new combination as respondent's record-keeping machine.

The general-purpose computer, though extremely complex, is an inchoate, an *incomplete* machine. The functional circuits (Adder, Compare, Branch, etc.) are not interrelated nor do they co-act in any useful way until structured[61] by the software programming into a special-purpose computer. The functional circuits are building

60. *In re Prater, supra.*

61. *See* Flores, (1969), *supra*, pp. 16, 17.

blocks used by the software; and in that respect the general-purpose computer is a " 'warehouse' of unrelated parts."[62]

This "storehouse of parts"[63] character of the general-purpose computer is evident from the hierarchical diagram *supra*, p. 30. Starting at the bottom level, each level serves as a storehouse of parts for the next higher level. The electrical components (resistors, diodes, transistors) serve no purpose by themselves and acquire functions only when connected in the various circuit configurations of the logic circuits. Similarly, the logic circuits serve only as a storehouse of parts for assembling the different circuit configurations of the functional units, and the latter circuits which constitute the general-purpose computer are interconnected by the software programming in the various sequences and combinations that make up the special-purpose computer.

The set of building blocks at each level is similar to the familiar toy Erector Set, whose parts can be connected in an unlimited number of ways to form machines of a wide variety of types. For example, with a storehouse of the electric components (resistors, diodes and transistors, etc.) almost all of the known electrical circuits can be built, including those of the computer logic circuits. With a storehouse of logic circuits, all of the various functional and other circuits of general-purpose computers can be built.[64] Similarly, the function circuits are interconnected by the software into an endless variety of automatic machines—a musical synthesizer, the controls of a lunar landing module, a document reader for electric meter reports, a calculator for thereafter calculating and printing the associ-

62. Patent Office Guidelines (1966), *supra.*

63. *In re Prater, supra.*

64. Special-purpose computers are also built directly from the logic circuits using permanent or hardware programming. One could also use the logic circuits as the functional units of the general-purpose computer, namely, the building blocks for software programming; but "such an approach would be impractically slow." Goldstine, H. H., *The Computer From Pascal to von Neumann*, (1972), p. 257.

ated electric bills. Respondent's record-keeping machine is similarly constructed in its preferred form of construction.

There is no predetermined relationship of the function circuits (Adder, Compare, Branch, etc. or their individual functions) to any of the above special-purpose computers and other devices; they are "*unrelated* parts"[65] (emphasis added). Nor is there a predetermined relationship of the resistors, diodes and transistors to a computer or television set. However, when the functional circuits of the general-purpose computer are structured into a "dynamic interrelationship" (Br. Pet. 36) by software programming—such as that of any of the above examples—these circuits are organized and interrelated by that programming just as are the electrical components in a television circuit. In that condition, the function sequencer makes the softwire connections called for by the stored program so that the functional circuits are connected into a special-purpose computer having the structure called for by the program.

The hardwire programming is used in building the functional circuits from the logic circuits and softwire programming is used in inter connecting the functional circuits into a special-purpose computer; both connect building blocks into more complex structures.

In short, as the Government asserted in another case, a software program may be "a technologically innovative product"[66] and may be demonstrated to have "technological superiority".[67]

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65. Patent Office Guidelines (1966), *supra*.

66. Government's Pretrial Brief in *United States v. IBM*, 69 Civ. 200, at p. 202.

67. *Ibid.* at p. 29. This Government Brief in the IBM case makes it clear that the software industry is in the business of selling technological products (machines) not "ideas" or "methods of doing business." *See* ADAPSO Brief amicus herein, p. 3, *et seq.*, which contrasts the different Government positions in this and the IBM case. *See* ADR Brief *amicus* herein p. 6, *et seq.* for a further discussion of the software industry as a business of machine products.

3. Hardware and software programming are equivalent and alternative approaches for the construction of computer systems and equally patentable.

The Patent Office has set up a false dichotomy in the patentability of computers. Those implemented by hardware programming (*e.g.*, the general-purpose digital computer) are recognized to be machines by petitioner and "patents covering such machines" (Br. Pet. 35) are granted subject to their meeting the statutory tests of novelty (35 U.S.C. §102) and unobviousness (35 U.S.C. §103). However, computers implemented by software programming are generally denied patentability.[68]

Petitioner's distinction between the two alternative forms of computer construction is inconsistent with the well-established technological "principle of the equivalence of [software] programming and hardware. This principle [is based on the fact] that a program for a general-purpose machine turns it into a special-purpose machine."[69]

Respondent's patent application also sets forth (A. 66-7) this equivalence and notes that the invention can be alternatively implemented in a hardwire embodiment.[70]

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68. The Patent Office is not consistent in this respect; many of the Examiners understand the machine structure of software, as shown by the recently issued patent for an "Analytic Character Recognition System" implemented by software, U.S. 3, 873, 972.

69. "The principle becomes more tangible when we compare in detail the logical design of that special-purpose machine with the flow chart of that program." Prof. Saul Gorn, Final Report No. AD 59 URI, at p. 4, from Univ. of Penna. Moore School of Elec. Eng. to U.S. Army Signal Research & Development Labs, 1959.

70. Two engineering approaches are available for constructing a complete hardware version of a special-purpose computer. One is to use the structure of the software programming and connect functional units (or more complex modules) by hardwire connections [*see* article by David M. Robinson, of the University of Delaware, "Digital System Design With Control Modules," *Proceedings of the Seventh Annual Institute of Electrical and Elec-*

Petitioner has acknowledged this equivalence of hardware and software means, namely, that a special-purpose computer can be built either by hardwired logic circuitry or by programming a general-purpose computer.[71] The particular means that is used (as respondent noted in his application, A. 67) depends upon many business and engineering trade-offs.[72]

This equivalence is inherent in the concept of the stored-program computer. The first electronic computer, the ENIAC built about 1945, was "not a stored-program

Note 70—*Continued*

tronic Engineers Computer Society, International Conference, February 27-March 1, 1973]. The other is to redesign the system of the special-purpose computer so that hardware programming is used to configure the logic circuits directly into the final hardwired system. Under 35 U.S.C. §112, the claims herein "shall be construed to cover the corresponding structure . . . described in the specification and equivalents thereof."

71. "The particular operations to be performed by a computer are governed by the state and configuration of its electronic circuitry [which] can be fully built into the computer through wires. . . . Alternatively, the computer may be designed so that the state or configuration of its circuitry can readily be changed without rewiring or other visible physical changes . . . by the use of different 'programs.'" (Br. Pet. 14, 15)

72. "Perhaps the most important part of the job of computer system design is to determine which functions are best handled by hardware, and which should be provided by software. All of the traditional engineering considerations come into play here. One must consider the added cost of additional hardware measured against possible gains in operating efficiency. One must consider the availability of manpower with the appropriate skills for design and for implementation. One must also consider intangible factors such as the inherent advantages of simplicity and the hidden costs of complexity.

"From the point of view of the computer user it makes no difference which features are incorporated into the hardware and which are programmed in software.

"It is the combined hardware-software system, the 'extended machine' that the user must rely on to provide the power and flexibility and convenience that have been promised with each new generation of computing equipment." S. Rosen (1968), *supra*.

computer. Programs were installed and changed by engineers who changed the wiring among its various components."[73] The stored-program concept, invented while the ENIAC was being built, had as its very purpose the replacement of the hardwire connections by the softwire. The first published description[74] of the stored-program computer clearly explained (p. 1, ¶1.2) that the program ("instructions"[75]) was "an integral part of the [computer's] structure."

As far back as 1949, when the first stored-program computer was constructed in England, its builders recognized the equivalence of programming by hardwire and softwire, and explained that additional functional circuits could be added to the computer or the equivalent software programming could be used to implement the same functions.[76]

The Patent Office has no difficulty in finding patentable subject matter in the hardwire approach to building

73. S. Rosen, Purdue University, "Electronic Computers: A Historical Survey," *Computing Surveys*, Vol. 1 (1969), pp. 7, 8.

74. A. W. Burks, H. H. Goldstine, J. von Neumann, *Preliminary Discussion of the Logical Design of an Electronic Computing Instrument*, 1946. In this famous "paper that became a landmark in the history of computer sciences if not in the history of human thought," (4 *New Encyclopedia Britannica: Macropaedia*, 1045, 1047) John von Neumann and his colleagues at the Institute for Advanced Study in Princeton first published "this stored-program concept" on which the modern computer is based and the technology of which underlies the issues in this case.

75. A human receives *instructions* on how to operate the manual choke in an automobile. When an *automatic* choke is built in by means of a "program," we don't think of "instructing" the engine or its controls. Yet that is the terminology of the computer industry established thirty years or more ago to describe the automatic controls of a stored program. The automatic control of the choke in future cars will be done by a more advanced programmed general-purpose computer, and appropriate computer "instructions" will be used for that purpose. *See* Vacroux, *infra*, n. 76, at p. 40.

76. M. V. Wilkes, "Progress in High-Speed Calculating Machine Design," *Nature*, Vol. 164 (1949) pp. 341-3.

special-purpose computers which technologically began to be replaced 30 years ago with stored-program inventions. However, it insists that the stored program approach which is the present foundation of the computer industry and is revolutionizing the entire electronics industry is not patentable.

The equivalence of hardware and software underlies this revolutionary change taking place today in the electronics industry. Programmed microcomputers (general-purpose computers constructed with "microscopic components"[77]) are used to build electronic apparatus in "a wide range of applications from specialized laboratory instruments to sales terminals and electronic games."[78]

"[C]ustom-designed large scale [digital] circuits . . . can be justified only when they are produced in volumes large enough (50,000 units, say) to amortize their development costs." Such expensive electronic systems that "cannot be modified or adapted for an application for which they are not designed" [are being replaced by] "versatile devices such as microprocessors incorporating no custom-made features except the contents of a . . . programmed . . . memory."

"Until recently digital circuits were designed almost exclusively with 'hardwired' logic . . . Although this approach is very powerful (indeed, it is used in most of the electronic equipment manufactured today), it yields an *inflexible* product that is difficult to modify or improve without major redesign. Most of the microcomputers in service today were adopted as a replacement for *inflexible* circuitry. . . . *it is to their flexibility, inherent in all stored-program systems, that they owe most of their popularity.*

* * *

"The automotive industry will probably be the largest single user of microcomputers. They will replace the

77. A. G. Vacroux, "Microcomputers," *supra*, pp. 32, 33.
78. *Ibid.*, p. 34.

custom-designed [hardwire] devices already installed by many manufacturers for monitoring brakes, lights and battery, for seat-belt interlocks and for skid control . . . they will take up many new functions such as the control of ignition, the optimization of the fuel-air mixture, the reduction of exhaust emissions and even the continuous indication of fuel consumption in miles per gallon."[79] (emphasis added)

Thus, the general-purpose computer has become (in miniature size) a tool that is structured by the addition of programs to build all kinds of instruments and apparatus. Each programmed microcomputer is a different electronic machine as is each hardwired device that the programmed microcomputer is replacing. Such electronic machines have unquestionably been patentable subject matter under 35 U.S.C. §101 when hardware programming was used. The objection to patentability based upon the use of the more modern and "flexible" technology of the stored program cannot be justified by any basis in law or fact.[80]

The denial of patents to a modern technology (the softwire mode of building special-purpose computers and other machines) raises anew the question: whether the Patent Office "freeze[s] . . . patents to old technologies, leaving no room for the revelations of the new, onrushing technology." (*Benson, supra*, at 71.)

79. A. G. Vacroux, "Microcomputers," *supra*, pp. 39, 40.

80. The failure to recognize the equivalence of hardware and software opens a pandora's box and leads inevitably to a "raiding" situation in which existing hardware patents have no legal protection from infringing software-constructed devices. *See Digitronics Corp. v. The New York Racing Association*, 67 Civ. 1119, U.S.D.C. (E.D.N.Y.), Memorandum Decision, Sept. 16, 1975. This problem is not limited to the computer field, for many automatic machines have the potential to employ a programmed general-purpose computer to replace their existing electronic, electrical or mechanical controls. *See* 2 *New Encyclopedia Britannica*, "Automation," *supra*.

B. "A Machine Is Not An Idea."

1. The Patent Office's "new use" argument does violence to the technological facts of computers.

The cases cited by the Patent Office do not support its "new use" position because they do not deal with the general-purpose computer or any other restructurable device.

The *new use* doctrine applies under the test set down by this Court in *Roberts v. Ryer*, 91 U.S. 150, 159, where there is "a change only in form, proportions or degree, doing substantially the same thing in the same way by substantially the same means." In that case and in each of the other cited new use cases what was *claimed* was substantially the same structure as the prior art.[81]

In this case respondent's *claimed* invention has an entirely different structure from that of the "existing"

81. In *Roberts v. Ryer*, *supra*, the unpatentable *new use* of an icebox was a *downards* circulation of air through the food chamber while the *old use* had the air circulating *upwards*. In *Ansonia Brass v. Electrical Supply*, 144 U.S. 11, 18, the *new use* of paint was as a noncombustible insulation for electric wires carrying *large* electric currents needed for lighting; it was unpatentable over the *old use* of the insulating paint for electric wires carrying *small* telegraph currents. In *General Electric Co. v. Jewel Incandescent Lamp Co.*, 326 U.S. 242, 247, 249, the *new use* of a second etching for frosted glass electric lamps was that of applying the etching to the *interior* of the glass. It was unpatentable in view of the *old use* of that second etching applied *externally* to electric lamps. In *Exer-Genie, Inc. v. McDonald*, 453 F.2d 132, *certiorari* denied, 405 U.S. 1075, the unpatentable *new use* was exercising with a machine; the *old use* of the same machine was as a fire escape device. In *Old Town Ribbon & Carbon Co. v. Columbia Ribbon & Carbon Mfg. Co.*, 159 F.2d 379, the unpatentable *new use* of duplicating sheets was for a "gelatin pad" duplicating process, where the *old use* of the same sheets was for a "spirit" duplicating process. In *Application of Zierden*, 411 F.2d 1325, the unpatentable *new use* of a chemical composition was that of removing and preventing alluvium deposits in water systems, where the *old use* of the same chemical composition was to prevent deposition of carbonate scale in such water systems.

general-purpose computer.[82] The structure produced by the software programming is:

> "an integral part of the [special-purpose computer's] design structure,"[83]

Respondent's patent claims call for a new combination of elements. Such combinations are patentable as specifically provided for in 35 U.S.C. §112, 3rd ¶, and as approved by the Court in cases from *Burr*, *supra* to *Graham v. Deere*, 383 U.S. 1.[84]

Just as the combination of components forming a novel logic circuit and the combination of logic circuits forming a novel functional circuit are patentable as machines or parts of machines, so are the special-purpose computers that are constructed by softwiring combinations of functional circuits. The universal characteristic of patentable combinations of elements in all technologies is that each of the elements has the "ability to perform . . . in varied ways" (Br. Pet. 35) with other elements to produce new combinations. So, too, the general-purpose computer, that "storehouse of parts," produces a new machine combination when it interacts with a stored program. The "new use" issue does not apply to the new machine combination defined in the claims which has a structure different from any other combination. Petitioner's legal argument of "new use" is

82. The prior art in each of the cited cases had an *old use*. In contrast to these new-use cases, petitioner does not set forth any *old use* of the general-purpose computer in constructing a theory of nonpatentability based on "new use." The unprogrammed general-purpose computer is an *incomplete* machine that has *no* end *use*. Without the structure of a stored program, it does not operate, for the hardware and software are "interdependent," not "independent" as the Patent Office insisted in *Benson*. (*See* Transcript of Oral Argument, hereinafter, Tr. *Benson*, at 4).

83. Burks, Goldstine, von Neumann, *supra*.

84. *See* also *O'Reilly v. Morse*, 56 U.S. (15 How.) 62; *The Telephone Cases*, 126 U.S. 1, *Mackay Radio and Telegraph Co. v. Radio Corp. of America*, 306 U.S. 86.

refuted by the undeniable fact that the general-purpose computer is a "storehouse of parts" structurable by and combinable with a stored program.[85]

Petitioner's brief makes it clear that his entire case is directed not against the claimed special-purpose computer, but against the stored program as a mode of construction for machines. Petitioner specifically attempts to exclude respondent's equivalent hardwire embodiment (A. 66-67) as "unrealistic" (Br. Pet. 33). Petitioner is unable to deny that the *claims* define a special-purpose computer whose general controls can be built with equivalent hardwire. The *claims* do not call for a stored program for the general controls. A hardwire embodiment may be quite realistic, as the cost for hardwire construction is lowered. Petitioner attempts to exclude the hardwire mode of construction from consideration in this case, because none of the "new use" arguments could be applied to hardwire even sophistically.

As to the softwire embodiment, both the C.C.P.A. and Board below agreed that "a new program makes an old general purpose digital computer into a new and different machine" (Pet. 19A) Judge Rich below specifically acknowledged "the validity of this principle" *(Ibid.)* noting that the "court has been through that many times" *(Ibid.)*; there has never been a dissent on that finding of the facts of computer programs.[86]

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85. An inventor of a general-purpose computer is no more "entitled to the benefit of all [its] uses" (Pet. Br. 36), than is the inventor of any other "storehouse of parts" such as the Erector Set or Tinkertoy, or a set of electrical components. Nor would the inventor of an Adder circuit in IBM's 1400 be entitled to use the IBM 1400 free of IBM's patents. The inventor of a patented element of a combination has a right to exclude others from use of that element in a combination, 35 U.S.C. §§271, 281, but he does not by a patent to that element acquire any rights to use of someone else's combination by reason of the element being *usable* therein.

86. The Board of Appeals specifically expressed its agreement with the C.C.P.A. on the validity of this restructuring principle

Petitioner's formulation of his "new use" theory is unsupported by any evidence of the structure of the programmed computer. He produces no facts in support of his theory and ignores the physical changes in the computer's circuitry that cannot be seen with the naked eye. These changes can be fully identified and measured internally, as well as externally by visible evidence of the transformation of input data to processed output data. Petitioner seems to scoff at an inquiry into the *structure* of the special-purpose computer and to argue, by analogy, that one can understand the dynamic structure of a river simply by observing its outer form (Br. Pet. 35, n. 25). Respondent submits, that, just as it is necessary to "step into" *(Ibid.)* a river to understand its "hierarchical

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(Pet. 28A). The Board, without in any way modifying its support of restructuring, also indicated in a formal rejection under 35 U.S.C. §112 (Pet. 30A), that the "meaning one chooses to assign outside the computer to a particular configuration of 'bits' in its memory" is not "structural." Though a program changes the general-purpose computer to "a different machine," such "meaning" does not. Respondent does not disagree with this position and does not assert patentability based on the difference between "a file of stock numbers rather than a file of sums of money." *(Ibid.)* Such a claim limitation does not affect patentability under 35 U.S.C. §101, but goes to the end use of the invention and to the scope of coverage of the patent that is requested. *See McClain v. Ortmayer*, 141 U.S. 419. The Board, however, revealed its lack of understanding of respondent's invention as defined in claims 20-24 (A. 107-9) for the "means for identifying" that the Board refers to (Pet. 30A) are defined in the claims as identifying the "category records" and the "totalizing records" and not "an 'account,' or a 'type of transaction,'" as its opinion states. This identifying means, as explained in the patent application (A. 18, 19, 47, 54, 73, 81, 82), tests the "initial identifier field" 164, 167, 170, 171 for the ledger format control signals. This "means for identifying" is an important part of the mechanism for co-action between the master and general controls, which the Board's opinion did not notice, unlike the C.C.P.A.'s (Pet. 5A).

structure"[87] that reveals the river's inner structure[88] and the "different" aspects of the "same river" *(Ibid.)* so it is necessary to open the doors of the computer housing and investigate its innards, for it also forms a hierarchical system that reveals its structure and the differences produced by a stored program.

Not only is petitioner's "new use" theory unsupported by any evidence in the record, it is contradicted by the evidence and by statements of the experts. Moreover, both the C.C.P.A. and the Board of Appeals below agree that respondent's invention is a "new machine" not a "use." Under these circumstances, the court has ruled

> A court of law, such as this Court is, rather than a court for correction of errors in fact finding, cannot undertake to review concurrent findings of fact by two courts below in the absence of a very obvious and exceptional showing of error. [citations omitted]

Graver Tank & Mfg. Co. v. Linde Air Products, 336 U.S. 271, 275 (1949).

Petitioner's "new use" case[89] culminates in a self-serving and deceptive metaphor which compares the

87. A. Iberall, "Viable Systems," *supra.*, p. 7.

88. "Consider a river flowing downstream as a constant current source. (The velocity field that makes up the river is derived from a gravitational potential and from ground waters.) Consider small particles carried by the stream. As a result of gravity, they fall vertically. Yet, upon their striking the bed of the stream, there is an interaction via hydrodynamic forces . . . The collection of these particles may now be characterized, by a continuum description of the bed load of the river, as a dynamic entity that will be subject to gross dynamic laws as the bed load interacts with elements in the macroscopic river-field (such as bends, changes in river shape or cross-sectional area, or changes in the character of the soil)." *(Ibid.)*

89. The "new use" theory is used spuriously to suggest (Br. Pet. 35-36) that the C.C.P.A. decision below would somehow give respondent a "partial monopoly" (whatever that is) to a general-purpose computer in the public domain. It is true that upon the expiration of IBM's patents on the hardware programming in the IBM 1400 computer, "their subject matter will fall into the public

stored computer program with recording devices such as the piano roll in the player piano. Overlooked entirely is the basic flaw in the analogy that the general-purpose computer is restructured when reprogrammed but the player piano is not restructured when a different piano roll is inserted. The fact that the resultant special-purpose computer has a new structure excludes the possibility that it is merely a new use of an old structure. Since the Patent Office has asserted to the Court that "precisely the heart of our case"[90] rests on this "piano roll" metaphor, it is dealt with in greater detail than it would otherwise merit.

Programs have been developed to structure a general-purpose computer into a musical synthesizer (see Appendix)[91]—an electronic counterpart of peti-

domain" *(Ibid.)* but without any restriction by reason of the patent requested by respondent. First, respondent's invention can also be hardwired and therefore is not limited to being constructed with a general-purpose computer, and with any particular one at that. Second, one or more of the elements of combination patents often are previously patented without the combination patents in any way removing the elements from the public domain. *See Cantrell v. Wallick*, 117 U.S. 689, 694. The parts of the "storehouse of parts" of the IBM 1400 may be combined in any way without restraint so long as they are not structured into respondent's machine, just as patented or unpatented transistors can be combined into patented television sets without removing anything from the public domain. The fact that the Erector Set (or any other kit of building blocks) can be used to construct and thereby infringe a patented combination does not take anything out of the public domain, neither by "partial monopoly" or otherwise, for the patented combination is not in the public domain until its patent expires. As the Court said in *United States v. Dubilier Condenser Corp.*, 289 U.S. 178, 186: "An inventor deprives the public of nothing which it enjoyed before his discovery, but gives something of value to the community by adding to the sum of useful knowledge." *See* also the Briefs *amici* of the American Patent Law Association, p. 11, *et seq.*, and of Software Associates, Inc., p. 24, *et seq.*

90. Tr. *Benson*, p. 17.

91. The musical synthesizer receives as inputs, punch card records (like a piano roll) of the musical notes to be reproduced.

tioner's player piano. The player piano, however, whatever piano roll it may play remains unchanged—still a player piano, with the same structure it had before since the player piano is not restructurable. The piano roll is merely input data, a record of the piano keys to be struck[92] and *not* a program.[93]

The spurious nature of the piano roll metaphor may be further seen by comparing the elementary functional circuits of the general-purpose computer to the end use of the programmed computer. A general-purpose com-

Note 91 —*Continued*

The synthesizer program configures the circuits to generate electrical signals corresponding to the desired musical tones which it may record as output on magnetic tape to be played later, or it can play the music at the same time with appropriate playback equipment. In the musical synthesizer shown in the Appendix the computer program provides additional structure for the illustrated general-purpose computer so that the input to the computer is in the form of sheet music notation (as the photograph illustrates), from which the programmed machine generates the output for reproducing the corresponding music. A composer can write his music and have it played back immediately.

92. A piano roll is a musical recording and any innovation in the music is not technological.

93. A variant of the piano roll metaphor is petitioner's comparison of the player piano and music box (Br. Pet. 16). Both the player piano and music box are special-purpose machines—machines for playing different musical recordings. The only difference is that the piano roll is more easily replaceable than is the recording disc or drum used in the music box. Neither is a general-purpose machine; neither can be changed to be other than what they are. Both the player piano and music box, unlike the incomplete general-purpose computer, are fixed-purpose and complete machines requiring only input data to operate; the input data are the piano roll and recording drum, respectively. A "fixed-wire computer" (Br. Pet. 16) is also a special-purpose machine which receives input and produces output in accordance with its own "rule of action." However, the general-purpose computer is in a unique class of devices—once structured by the addition of programming it becomes a special-purpose machine with the rule of action of the particular fixed-wire computer or other fixed-purpose machine it was structured to become.

puter can be restructured into an infinite variety of special-purpose computers, or fixed-purpose machines ranging from the musical synthesizer to a talking computer, or one for recognition of printed characters, or a computer-operated typesetter or airline reservation system. In any case as the above examples illustrate, the elements that make up the general-purpose computer are not related to its ultimate function. In the case of the musical synthesizer, the functions of the Adder, Compare, Fetch and Store circuits and Branch control are unrelated to the synthesizing of music. This is also true of these other special-purpose computers or machines, all of which are structured out of the same "storehouse of parts," the functional circuits of the general-purpose computer.[94] The elementary nature of their operations do not foretell the types of machines that can be produced from them.[95]

Respondent's invention lies in the structuring of the control mechanisms in two different parts of the overall computer system, and the control of one by the other. This construction leads synergistically to the end result of each user being able to communicate directly with the computer and tell the computer how to keep his books with all his own individuality, and to do this in concert with a thousand others, each having the same freedom of action in keeping his financial accounts in his own way.

94. An important characteristic of a special-purpose computer is its ability to make "decisions," that is, to alter its sequence of operation depending upon the occurrence of certain conditions of operation or in the input or output data. The general-purpose computer is constructed with Compare and Branch circuits so that it can be restructured by a program to incorporate "decision" control mechanisms; that characteristic is nonexistent in the player piano. *See amicus* Brief herein of Applied Data Research, Sec. 2A for a discussion of the "decision" characteristic of special-purpose computers.

95. In the case of respondent's invention there are some relatively simple arithmetic operations that form a part of the system. However, it is not the arithmetic operations as such that are the novelty of this invention.

This "synergistic" result compared to the "several effects" of the individual function circuits (Add, Compare, Branch) is "an effect greater than the sum of the several effects taken separately." *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 61 (1969). In contrast to respondent's adaptive machine, in the player piano the strings and their tones have the identical relation to the musical end use whatever piano roll is played. The structure of the piano is never changed.

2. *The claimed invention is a patentable machine, not an "idea" or "method of doing business."*

Unlike other record-keeping machines,[96] which only have one set of controls that directs the processing of the data in the data files, respondent's invention has two sets of controls: a set of general controls for operations common to most users' accounts and a set of specific master controls in the data file of each individual account. This structure of respondent's apparatus gives it the flexibility and adaptability to handle any small user's ledger format. Because there is a master control in each data file, respondent's machine can implement a different bookkeeping system for each customer without the burdensome and inflexible requirement of building into the general program control each individual bookkeeping method and ledger format. Locating the master controls in the data files greatly simplifies the incorporation of changes in each individual customer's bookkeeping system; it is not necessary to change the general control. It is the configuration of machine elements and not the particular bookkeeping system a user has that gives the invention its unique properties. He can have any bookkeeping system he desires with this machine.

The C.C.P.A. recognized that the gist of respondent's

96. Note particularly the prior art cited by petitioner.

invention was a machine structure[97]—the interacting "general control" and "master control" (Pet. 5A)—and held that it was not a method of doing business:

> The appealed apparatus claims are not drawn to cover either a method of doing business or even a method of bookkeeping . . . . [o]bviously, banks would be free to so expand their services and use any apparatus they may desire *except* the apparatus set forth in appellant's claims." (Pet. 14A) (emphasis the court's).

Banks and others are assisted by machines such as respondent's invention in performing additional services for their customers. If they did not wish to use respondent's invention, they would be free to use any other machine construction for performing those identical services, including those proposed by the Patent Office and others.[98] Thus, respondent's invention, like a pen, a typewriter or a cash register, can be used to assist banks or others (such as accountants and data processing centers) in performing services for small businesses, professionals, and others in keeping their financial

97. The C.C.P.A. found the claims were "in typical means-plus-function language, which is especially sanctioned by the third paragraph of §112, the appealed *apparatus* claims are clearly drawn to a 'record-keeping *machine* system' " (Pet. 12A), and that "the claimed *apparatus* automatically performs the identifying operations [of the claims]; those operations are neither actually performed by a human being nor can we imagine how they could realistically be performed by a human being." *See In re Bernhart*. Pet. 13A)

98. The Patent Office has suggested that the machine of the Dirks patent can be used for performing similar services and the Board of Appeals has proposed still another alternative mode of machine construction. Other non-infringing modes of machine construction are also available for performing the same service.

There is *no* infringement when the alleged infringing machine and patented machine "perform different functions, *or* in a different way, *or* produce substantially a different result." *Machine Co. v. Murphy*, 97 U.S. 120; *see Cantrell v. Wallick*, 117 U.S. 689, 695.

records, but would not inhibit anyone from engaging in such services so long as they did not use respondent's invention.

Unlike *Gottschalk v. Benson*, 409 U.S. 63, the invention involved in this case is not an "algorithm," nor a mathematical "procedure." In *Benson*, the Court made it clear that a monopoly for a mathematical algorithm was the issue. In this case no mathematical formula or series of steps is claimed. While the details of a software program are a series of steps, that construction does not convert a machine invention into an unpatentable algorithm any more than the fact that an automobile engine has an automatic control (*e.g.*, a cam shaft) which causes a series of steps to be taken makes the auto engine unpatentable. In the automobile, the steps are mechanical,[99] in this case electrical; both are within the "useful Arts." In *Benson*, the Court was concerned with the steps of the BCD-to-binary conversion algorithm which were purely mathematical, therefore, outside the "useful Arts." It was the mathematical process and not the use of software as a mode of construction that was the defect in *Benson*; Johnston's invention is directed to an innovation in machine control structure, not mathematics and does not suffer from the *Benson* disability. Unlike *Benson*, the claims herein are limited to a particular art and technology, to a particular apparatus and machine, and to a particular end use. The only thing that would be patented by these claims is a machine. *Burr v. Duryee, supra.*

The computer technology deals with a sub-human activity that superficially is associated with the mind.[100]

99. But the program control in an automobile has become more electrical as more complex automatic controls are found to be needed, and will soon be constructed with a programmed general-purpose computer.

100. "[i]n the words of James Clerk Maxwell, 'the human mind is seldom satisfied, and is certainly never exercising its highest functions, when it is doing the work of a calculating machine' . . . Just as the use of man's muscles for pumping water was inefficient, so was the use of his mind for carrying out calculations . . . Computing is thus subhuman in that it calls on very few of man's manifold abilities and yet is fundamental to many of his other activities." *Goldstine, supra*, at p. 343.

Any patent to respondent's special-purpose machine would not cover any "abstract idea," because any bank is free to practice record-keeping by any manual or machine process. The only limitation is respondent's specific machine construction, which is no more the embodiment of an "abstract idea," than is a novel structure for an adding machine.

The Constitution defines the field in which the patent power may be applied as the "useful Arts," U.S. Const., Art. I, §8.[101] This limitation to the technological arts[102] has been implemented by the congressional command that, *inter alia*, *machines* are to be granted patents. As the Board stated (Pet. 31A-32A), "technological" is defined as ". . . improvement in technical processes that increase the productivity of machines and eliminate manual operations." Respondent's invention on both scores is clearly *technological*.

Claims outside the technological arts for mathematical formulas and algorithms, laws of nature, and natural phenomena, are unpatentable; in this category have been included methods of doing business.[103] *Compare Seagram & Sons v. Maryall*, 180 F.2d 26 (claims defining method for sampling consumer preferences in beverages, outside the technological arts held unpatentable subject matter); *Loew's Drive-In Theatres, Inc. v. Park-In Theatres, Inc.*, 174 F.2d 547, (concept of an outdoor movie business to show movies to people sitting in their automobiles was not within the technological arts, hence, unpatentable, though the theater construction itself would be patentable as a "manufacture" if new and unobvious, and specific claims defining concrete embodiment of the drive-in theater were viewed as technological and their

101. *Graham v. John Deere*, 383 U.S. 1.

102. As noted by the court below, the "useful Arts" are the "technological arts," (Pet. 13A).

103. *See Guthrie v. Curlett*, 10 F.2d 725.

non-obviousness tested in the ordinary way, by comparison with the prior art);[104] *O'Reilly v. Morse*, *supra* (a claim for the general idea of transmitting messages at a distance using electromagnetism was held not to be defining a particular technological advance, hence, unpatentable, but claims defining specific electromagnetic apparatus for transmitting messages at a distance, held to be within the technological arts, hence, patentable).

The C.C.P.A. recognized that machines such as respondent's are squarely within the technological arts, hence, patentable subject matter. In its attempt to characterize such inventions as outside the technological arts, the Government misrepresents their nature. The significance of the specific machine structure consisting of the combination of a general control and separate master controls for each user's individualized record-keeping is ignored in petitioner's brief. By ignoring the machine nature of the invention, the Patent Office attempts to convince the Court that all that is claimed is the "idea of having banks program and use their computers to provide an additional service for their customers." That statement is simply false: all that is claimed is a specific machine structure which enables computer centers, accountants, banks or anyone else to do so. Any device with a *different structure* based on "the idea" would not be covered by the patent, and banks would be free to use different apparatus than the particular special-purpose computer defined in the claims to provide the same services respondent's machine provides.

The Patent Office also mischaracterizes the innovative process that goes into the development of a computer program. It suggests (without any evidentiary support whatsoever) that once the ultimate "purpose" of the invention is formulated, the rest of the development of the

104. Claims held unpatentable on obviousness, not on grounds of statutory subject matter.

program is routine (Br. Pet. 16-17).[105] Since the Patent Office attempts to portray the "purpose" of respondent's invention as well as of all programs as a mere abstract idea, arguably the implementation of that abstract idea would have to be unobvious. Such a rule, however, is only invoked in cases such as *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130, which deal with some innovation in the non-technological arts and is simply a guard against patents for tangible embodiments that are nothing more than the underlying unpatentable subject matter.[106]

Petitioner misstates the application of the rule of unobviousness under 35 U.S.C. §103. The invention as a whole must be considered in determining patentability, both conception and the claimed construction; *Graham v. Deere*, 383 U.S. 1, 32. Respondent's conception is not a method of doing business, however useful it may be to businesses. Respondent recognized the problem of providing a machine so constructed as to permit any small user to obtain the benefit of computer processing without losing the individuality of his record-keeping format and procedures. His successful solution to that problem is a novel adaptive computer construction with a combination of interacting master and general control mechanisms that permits the user to supply his ledger format directly to the computer to be effective as controls without requiring the design of a special set of general controls for that format.

105. The innovative process in software programming as in hardware programming relates to overcoming machine problems and "technological roadblocks," (*Computers in the 1980's*, R. Turn, 1974, p. 21). *See* the ADAPSO Brief *amicus* herein, pp. 26-30 for a discussion of "The engineering of software" and "The invention process in software."

106. Even if the *Funk* rule would be applicable to this case, it is submitted that innovative features such as the interacting machine controls identified by the C.C.P.A. herein are in the design of a specific machine structure, not in the formulation of an ultimate purpose.

The discovery of the problem is part of the "invention as a whole" that must be considered for unobviousness, *Eibel v. Paper Co.*, 261 U.S., 45, 68; *United States v. Adams*, 383 U.S. 39, 52. In addition, the conception of the solution of the problem as a set of master controls for retaining the individualities in users' ledger formats is part of the "invention as a whole." Likewise, the implementation of the particular general controls and of the co-action with the master controls, the former functioning as a slave to the latter, is part of the "invention as a whole," as discussed in greater detail below in Section IV dealing with the unobviousness of respondent's invention.[107]

The differences between process and machine are fundamental in dealing with the issues in this case. As the Court said in *Tilghman v. Proctor*, at 728, 12 Otto 707, 728:

> A machine is a thing. A process is an act, or a mode of acting. The one is visible to the eye; an object of perpetual observation. The other is a conception of the mind, seen only by its effects when being executed or performed.

The dichotomy between machine and process is emphasized in *Burr v. Duryee*, *supra*, at 570: "A machine is not . . . an idea." The process is the intangible; the machine is the tangible.

During oral argument in *Benson*, the Patent Office distinguished a machine claim from a method claim as follows (Tr. *Benson*, 10):

> But in the case of machines or other tangible products, the patent is not granted on the idea but on the tangible object itself, so that the ideas themselves are not monopolized except in the limited tangible form in which they are embodied in the machine or manufactured product.

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107. For a more extensive discussion of this question, *see* Brief *amicus* for the American Patent Law Association, pp. 7-10.

This Patent Office statement completely contradicts the Patent Office's red herring argument (Pet. Br. 36, n. 28) that the "effect of a machine patent would be even broader than that of the process patent." *See* also *Waxham v. Smith*, 294 U.S. 20 (1935): One "does not avoid infringement of [patentee's] *method* patent merely by employing it in a machine of different structure than [patentee's]" (emphasis added) and *Benson*, *supra*, 69-70, quoting a similar statement with approval from *Cochrane v. Deener*, 94 U.S. 780.

Thus, the entire approach of petitioner in this case has been not to deal with the merits of respondent's invention as a machine, but instead to wishfully designate it an "idea," a "use" and a "new use" or a "method of doing business" so that it can be challenged as an unpatentable abstraction. It is clear from the claims that respondent defines his invention as a machine; it operates as a machine; it provides a machine solution to a machine problem and produces an end result that only a machine can produce; for as the court below found (Pet. 13A) "nor can we imagine how [the apparatus operations] could be realistically performed by a human being." Calling this invention an "idea" scores of times does not change its physical character, but such an obfuscatory attempt to convert a "machine" into the abstraction of a "process" to prevent the proper application of the patent law is precisely what this Court condemned in *Burr v. Duryee*, *supra*, at 577:

> In this case we have an attempt to convert an improved machine into an abstraction, a principle or mode of operation, or a still more vague and indefinite entity often resorted to in argument, an "idea." Those who use the latter term seem to have no fixed idea of what they mean by it. But it may be used . . . successfully to mystify a plain matter.

Petitioner's case against the patentability of all programmed computers is similarly fabricated by desig-

nating them all as "ideas" rather than by analyzing their structure as machines. Not only is there no authority for removing any part of a machine from patent protection by reason of the manner in which it is constructed, it violates the clear mandate of Congress that there be no such exclusions. The enormity of petitioner's request for an adverse Court ruling on computer programs is that it would exclude the most complex technology known today from the patent system.

III. Equal Protection Requires that Respondent's Machine Invention Be Given the Same Patent Protection Afforded any New and Unobvious Machine.

Petitioner's classification of a softwired special-purpose computer such as respondent's invention as non-patentable subject matter lacks any rational basis in fact; hence, it violates respondent's equal protection rights under the Fifth Amendment.[108] Respondent may not be denied patent protection for his machine invention solely because it is software-embodied absent some rational basis for the discrimination, *see Morey v. Doud*, 354 U.S. 457, 465 (1967). In that case the Court found arbitrary, and therefore unconstitutional, legislation which exempted the American Express Company from requirements imposed on all other vendors of money orders. The same sort of arbitrary economic favoritism condemned in that case is at the heart of the denial of patents to inventors of software-embodied special-purpose computers while granting patents to inventors of hardware-embodied special-purpose computers.[109]

108. While the Fifth Amendment does not contain an explicit Equal Protection clause, Equal Protection standards applicable to the Federal Government have been incorporated into the Due Process clause of the Fifth Amendment. *See Richardson v. Belcher*, 404 U.S. 78, 81 (1971); *Bolling v. Sharpe*, 347 U.S. 497, 499 (1954).

109. Three different comparisons describe the discrimination against software. First, the Commissioner would grant a patent on the hardware embodiment of a particular special-purpose computer but not on the equivalent software embodiment of the very same machine. Second, the Commissioner would grant patents for the innovative machine products of the hardware manufacturers but not the innovative machine products of their competitors, the small software companies (see ADAPSO and ADR Briefs *amici* herein). Third, while machines as a class are patentable, 35 U.S.C. §101, the Commissioner has singled out software-embodied machines and no others as unpatentable. These discriminations are all predicated on a myth of the non-machine—the bald assertion that a machine constructed with software is an "idea" in direct conflict with the rulings of the Court; *Burr v. Duryee*, *supra*.

The instant case is even stronger than *Morey v. Doud* because the patent statute is by its terms generally inclusive.[110] This is not a case in which great deference need be given a studied intentional congressional act of exclusion since there was none. To the contrary, the patent policy urged by the Government here violates the Small Business Act[111] in that it discriminates against the small businesses which form the heart and core of the software products industry. Such an inconsistent action by the Government should certainly be predicated upon a sound legal basis rather than a Luddite[112] policy of

110. "[W]hoever invents . . . *any* new and useful . . . machine . . . may obtain a patent therefor. . . ." 35 U.S.C. §101 (emphasis added). The only exception from patentability of a specific machine technology is that of atomic weapons; see 42 U.S.C. §2181; but Congress otherwise provided for incentive compensation 42 U.S.C. §2187(b), (3). There Congress made explicit the exception, reinforcing its mandate that all other machine technologies were intended to be patentable subject matter.

111. 15 U.S.C. §631, provides: "It is the declared policy of the Congress that the Government should aid, counsel, assist, and protect, insofar as is possible, the interests of small-business concerns in order to preserve free competitive enterprise . . . and to maintain and strengthen the over-all economy of the Nation."

112. "We are probably now at about the comparable point in time in the Computer Revolution to that in the Industrial Revolution when the Luddites were vainly smashing equipment." H. H. Goldstine, *supra*, p. 347. For the last decade and more, there have been hysterical arguments raised against the patenting of software-embodied inventions. First Amendment questions raising the

opposing technological advances. No judicial sanction should be given a strained administrative interpretation that runs counter to the clear import of the statute. While an action of the Commissioner that is consistent with an explicit congressional directive is entitled to deference, when he acts on his own discretion and without congressional support, "a very different question is presented." *Boyden v. Comm'r. of Patents*, 441 F.2d 1041, 1044 (D.C. Cir. 1971).

The Commissioner of Patents offers no justification related to the purposes of the Patent Act for his classification of software inventions as unpatentable. He does not deny that all machines are patentable subject matter. Instead, the petitioner defends the discrimination with the bald mischaracterization of the programmed general-purpose computer as an "idea" and not a new machine. This strained unrealistic attempt to rule out an entire machine technology from the patent laws cannot withstand scrutiny. While there is much verbiage in the petitioner's brief that disparages the machine nature of programmed general-purpose computers, he has not presented one bit of supporting evidence to any tribunal in this case.[113]

Note 112—*Continued*

spectre of complete computer domination, panicked fears of the undermining of the patent system, concocted theories of machines being "ideas" and of administrative convenience, have been among the many short-lived stratagems put forth to deny recognition to the uncontrovertible advances of software technology. Must we be so fearful of humankind's ability to utilize technology beneficially that it is necessary to stonewall against further technological advancement by denying its existence and discouraging its forward thrust.

113. The C.C.P.A. has long held that programming a general-purpose computer structures the computer into a different machine. The Board of Appeals so ruled in respondent's favor in this case (Pet. 28A) holding that the invention is a machine. Petitioner is barred by the patent statutes on appellate jurisdiction from contesting that finding here (see Section I, *supra*).

When the Patent Commissioner singles out for exclusion the economically struggling segment of the data processing industry, and has favored the "economic" interests of the "collective forces of major hardware (i.e., computer) manufacturers and their representative associations,"[114] judicial protection against unjustified discrimination is especially necessary. That this is so, is made painfully clear by the monopoly conditions which exist in the computer industry and which the Government admits has proved so harmful to the software products industry and to our national interests (see ADAPSO Brief herein, "The Absence of Competition in Software," p. 3, *et seq.*). In *Dukes v. New Orleans*,[115] the court, quoting *Morey v. Doud, supra*, held that favoritism of a particular segment of an industry without apparent reason is discrimination of "unusual character" requiring "careful consideration." 501 F.2d at 710. Although giving great deference to governmental actions in the economic sphere, no rational basis was found to support the discrimination in that case, and it was struck down as unconstitutional.[116]

The form of construction of a special-purpose computer — with hardware or software — bears no relationship to the patent law or any other legitimate government interest. The "useful Arts" are promoted equally by hardware and software patents. In fact, the exclusion of soft-

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114. Judge Rich's dissent below, Pet. 20A.

115. 501 F.2d 706 (5th Cir. 1974), appellee's motion to proceed *in forma pauperis* granted, 95 S.Ct. 1556 (1975). In that case, an ordinance which banned food vendors from New Orleans' Old Quarter unless they had been in operation for 8 years was struck down as unconstitutional since the classification bore no rational relationship to any legitimate state interest.

116. *See Pavone v. Louisiana State Board*, 364 F.Supp. 961 (E.D. La. 1973), *aff'd*. 505 F.2d 1022 (5th Cir. 1974) (one licensed to cut only women's hair could not be prohibited from cutting men's hair since there were no relevant differences between the two); *Bolton v. Texas Board*, 350 F.Supp. 494 (N.D. Tex.), *aff'd*. 409 U.S. 807 (1972).

ware patents has had a severely detrimental effect on the functioning of the patent system. Since hardware and software can be alternative embodiments of the same machine structure, it is necessary to conduct a search of the prior software art to determine whether a particular hardware invention is novel.[117] The lack of software patents means that there have been inadequate search facilities for hardware.[118]

Different treatment based on irrelevant distinctions is unconstitutional, *Mayhue v. Plantation*, 375 F.2d 447 (5th Cir. 1967).[119] In this case, since invention can take

117. The 1966 Report of the President's Commission on the Patent System (reprinted in S. Doc. No. 5, 90th Cong., 1st Sess.; p. 21) reflected the inaccurate and one-sided view of the hardware manufacturers that the software state of the art is irrelevant to hardware. It is to be regretted that the President's Commission permitted itself to be used as a vehicle for the dissemination of this technologically unsound point of view. Much of the innovation in hardware was and still is first achieved in software. Software prior art is as essential as the hardware prior art to adequate examination of the novelty of a hardware-implemented invention. Similarly, both are needed for examination of an equivalent software-implemented invention.

118. Delinquent in its duties for many years, the Patent Office finally in 1972 "initiated a pilot program, with the cooperation of the Bureau of Standards, to develop techniques for classification and searching of the computer programming art." (*See* Pet. Br. *Benson*, p. 31). Since no longer is the argument being raised by the Patent Office about inadequate search facilities, one must conclude that the problem has been solved. The tragedy is that so-called "search facilities" were permitted to become a problem at all. Only the hardware manufacturers benefitted during the interim period because it meant that the Examiners were being deprived of the proper research facilities to evaluate the so-called "hardware" inventions, thereby seriously undermining the entire credibility of the patent system. Fortunately, the Patent Office has apparently, albeit belatedly, taken corrective action.

119. An ordinance establishing longer hours during which taverns could sell liquor for off-premises consumption than could package stores was struck down since the nature of the selling establishment was irrelevant to the state's purpose of regulating sale of liquor for off-premises consumption.

place equally in hardware and software (the choice of construction often being a matter merely of "trade-offs") and since the two embodiments are technologically equivalent, both most be treated identically for purposes of the patent law.[120]

The Government's suggestion of alternative modes of protection for software innovations, such as trade secrets or copyrights,[121] are inadequate and inappropriate to the task, and destructive of the constitutional purpose of the patent system as an incentive to machine innovation.[122] There is no evidence of any intent of Congress to relegate software inventors to reliance on other means of protection.

Copyright protects particular expression, not machine structure. There is no requirement of innovation, only originality; therefore, a copyright would not protect the machine configuration that is at the heart of respondent's invention. The fact that a "program" can be represented as a list of computer operations is no more significant than the fact that a radio circuit can be represented in a schematic diagram. An innovative radio circuit would not be protected by a copyright on a drawing and the special-purpose computer that is respondent's invention would not be protected by a copyright on a program listing.

120. *See American Trust Co. v. South Carolina State Board*, 381 F.Supp. 313 (D.S.C. 1974) holding that all domestic corporations, whether controlled by local or out-of-state interests, were equally competent to serve as executors and administrators, hence, discriminatory statute against out-of-state interests was unconstitutional.

121. Here, too, with respect to copyrights, the 1966 President's Commission allowed itself to be used as an instrument to becloud the issue. The recommendations of the 1966 President's Commission seeking to deny patentability to software-implemented inventions were soundly rejected by Congress; see H.R. 5924, proposed, 35 U.S.C. §106, 90th Cong., 1st Sess. (1967).

122. The "poor-quality software" that presently exists and the need for the incentive of the patent system is described in the ADAPSO Brief herein, pp. 6-11.

Trade secrecy is not only inadequate, but forced reliance on it violates the patent policy of disclosure which is needed to advance the "useful Arts". To the inventor, it is burdensome and often impossible to assure the complete secrecy that is required to retain the value of the innovation. Beyond this, reliance on this mode of protection has the counterproductive effect, opposed by public policy, of deterring disclosure of software innovations, hence, inhibiting the progress of the "useful Arts." Neither trade secrecy nor copyright is a substitute for equal treatment under the patent law.

In sum, the petitioner's arbitrary refusal[123] to grant patents for software inventions, in addition to violating the clear command of the statute, is a deprivation of the inventor's equal protection rights. The petitioner admits that all machines are patentable subject matter and offers no rational reasons for excluding the software machine technology. All the evidence establishes conclusively that respondent's software invention is a new machine. The Board of Appeals so found and the Commissioner, petitioner herein, is bound by that ruling. Petitioner's only answer to the equal protection dilemma is the bald assertion that the invention is a "use" not a machine. Without any evidentiary support, contrary to the views of both the Board and the C.C.P.A., and not jurisdictionally before this Court, that assertion cannot justify nor sustain an unconstitutional Patent Office policy of wholly irrational and unequal treatment.

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123. In 1968, the then-Commissioner of Patents stated: "The present Office policy of refusing patents in this [computer program] field has acted as a strong deterrent to the filing of applications." (Commissioner Brenner, *supra*, p. B-12) By its action, the Patent Office acted legislatively in opposition to the patent statutes and to the Small Business Act. While the most direct sufferers of this Patent Office policy are the software products companies engaged in innovative machine building, it is a fact that the loss is suffered by the whole nation which is deprived of the knowledge that would be disclosed to it by the award of a patent.

IV. Respondent's Machine Invention is Unobvious in View of the Prior Art.

Both tribunals below found that respondent's invention is a "new machine"; the remaining question is whether this machine considered "as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art . . ." 35 U.S.C. §103. The test of obviousness requires that the differences between respondent's claimed invention and the prior art be considered to determine "obviousness or unobviousness." *Graham v. Deere, supra.*

The Patent Office relies on two prior record-keeping machines as prior art in this case. It concedes by its silence that neither of the alleged prior machines is concerned with the specific machine problem of providing an automatic record-keeping machine that would enable a large number of small users to get the benefit of large-scale electronic computer equipment and still continue to use their individual ledger format and bookkeeping methods. Respondent's machine achieves that end result—the alleged prior machines do not, and the Patent Office does not suggest that they do.

The patent claims (Pet. 5A) call for an automatic record-keeping machine which has two sets of controls, as the C.C.P.A. found, (Ibid.) "a master control" and "a general control." The latter functions as a slave to the master controls, which contain the controls for all of the variations in ledger formats and bookkeeping methods that may exist from one user to the next. The general controls contain the controls that are common to the various users; they configure the circuits to identify the particular master controls in the data filed and perform the combinations of operations called for by the master. The master controls are retained in the date files so that they can be changed easily as though they were data. By this construction and the "dynamic interrelationship" (Br.

Pet. 36) between the two sets of controls all the variations in control can be built into the machine without the expense and difficulty of designing a general control for specifically processing each variation in ledger format.[124]

The claims call for the entire context of a special-purpose computer, including input and output devices, a memory, a processor and the interrelated master and general controls for performing the specific record-keeping operations, so that the machine adapts to whatever variations in ledger format a user may specify. Thus the combination of elements defined by the claim is that of a completely automatic machine for performing the record-keeping.

The C.C.P.A. found that the alleged prior machines are not concerned with the same machine problem nor have they arrived at respondent's machine solution; they

> "simply are not suggestive of the subject matter of the appealed claims." (Pet. 16A)

Neither of the prior machines remotely suggests the two sets of interacting controls that are at the heart of the respondent's invention. For example, as the C.C.P.A. pointed out (Pet. 13A), "the claimed *apparatus* automatically performs the identifying operations." This "means for identifying," as set forth in the claims, is the control mechanism of the general controls that interacts with the master controls to carry out the control operation called for by the master controls.[125]

124. Petitioner's summary of claim 20 omits all mention of these controls and their interrelationship; this summary (Br. Pet. 5) is inaccurately presented in indented format as though a quotation.

125. It is clear from Dirks that his machine system employs a uniform format of programming, with the location of all of the items of data being pre-arranged, *i.e.*, "the data is recorded in sequence in a track and is therefore readily accessible. . . . The program has merely to direct addition or subtraction." (A. 106, col. 26, lines 41-3). This is in direct contrast to respondent's system, in

The Patent Office nowhere suggests: (a) that either of the alleged prior systems is constructed in the same way as respondent's machine, *inter alia*, with the same combination of controls; nor (b) that either would operate in the same way as respondent's machine with the controls interacting to adapt to each user's ledger format; nor (c) that either would produce the same end result of respondent's machine of processing the financial records of large numbers of small users each with an individual ledger format.

The Board of Appeals' discussion of the resemblances between its proposed modification of a prior machine and respondent's is limited to a discussion of the use of "category codes" on the checks and deposit slips and in the ledger.[126] Respondent does not rely on the novelty of "category codes" for patentability; nor on the "meaning" of the coded machine signals.[127] The Dirks' machine could be constructed with "category codes" to identify the various categories of records and any desired meanings can be assigned to the signals, but it would not be the same machine as defined in the claims. Such a modification of Dirks would neither infringe the claims nor would it anticipate the claims. For even if the alleged prior machines contained the asserted category codes, they nevertheless would not have the two sets of interacting controls, nor would they provide a machine which would automatically keep records for a large number of individual users having different ledger formats and bookkeeping records. They would not be

which the circuits first identify what types of operations are called for by the user's ledger format in the master controls. These latter controls are directly associated with the data on which the operations are to be performed, so that the data is intermixed with controls and not "recorded in sequence" as in Dirks.

126. Judge Markey's dissent acknowledges that respondent's invention is not disclosed in the prior art and, his dissent is likewise limited to the question of whether "category codes" would be obvious.

127. *See* n. 86, *supra*.

multi-format machines, and especially not respondent's claimed adaptive multi-format machine.

The Dirks machine is cited by petitioner (Pet. Br. 40, n. 33) to suggest that a machine is there disclosed which is usable for "networks of individual departments of a large business corporation" and for "personalized files." Dirks' solution to his problem is to provide a separate computer for each department (A. 97, col. 7, lines 57-61):

> . . . to provide a complete satellite system of smaller personalized computers, in which a group of *smaller* computers cooperate with each other in a wire *network* for the exchange of data required at other places. (emphasis added)

The users served by respondent's invention are too small to afford even one of Dirks' "smaller computers." The use of a separate general program for each user's own ledger format was not a satisfactory solution to the machine problem confronted by respondent. Certainly, Dirks' use of a separate computer for each user is even less satisfactory (though it may be quite satisfactory for Dirks' problem of processing data for a multi-department corporation). Clearly, the claimed record-keeping machine herein is not even remotely suggested by Dirks.

The Patent Office, by pulling out of the Dirks patent various words, phrases and sentences, seeks to find in Dirks resemblances to respondent's system. This technique of misapplication of the Dirks patent to the claims was rejected out of hand by the Court below (Pet. 16A):

> We find that, with appellant's specification before them, the board and solicitor have merely chosen various portions of the Dirks apparatus and have attempted to read them upon various elements set forth in appellant's claims.[128]

Accordingly, respondent's invention is constructed differently, operates differently, and produces a different end result; the prior art is, as the C.C.P.A. found, "simply not suggestive of the subject matter of the appealed claims" (Pet. 16A). Essentially, the only resemblances between the alleged prior art and that of respondent are that they are both record-keeping machines. The differences are substantial differences and the invention considered as a whole is clearly not *obvious*. *Graham v. Deere, supra.*

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128. With that technique, petitioner's searching (Br. Pet. 41) through the Dirks patent (respondent has deposited with the Court complete copies of the Dirks patent in a full-size type face) has come up with a sentence stating that in the Dirks system "programming is very easy and different programs are very easily coordinated." Dirks does not explain what programs are "coordinated" nor for what purpose, whether it is coordination among satellite computers or coordination performed by a programmer in designing the programs. Dirks clearly does not disclose the claimed two sets of controls with the interacting master and general controls. Respondent's invention makes it unnecessary to construct separate programs for the master controls, while Dirks requires separate programs for each of the "network" of "smaller computers."

CONCLUSION

Petitioner is jurisdictionally barred from raising herein the "new use" which underlies the Patent Office opposition to the patentability of programmed general-purpose computers. In any event, the decision below should be affirmed for the reasons set forth above both as to the patentability of respondent's programmed computer as a machine and as to its unobviousness over the prior art.

Respectfully submitted,

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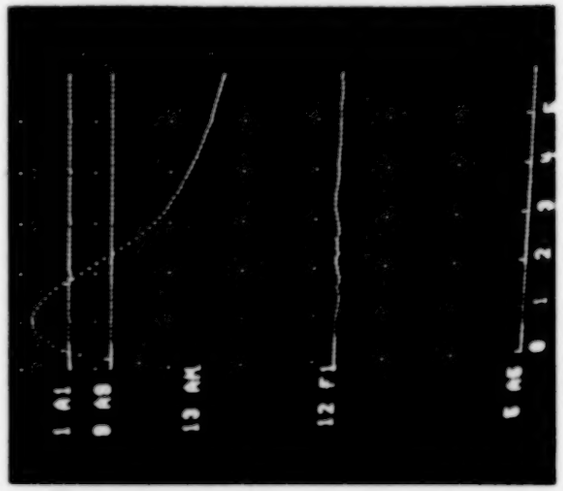
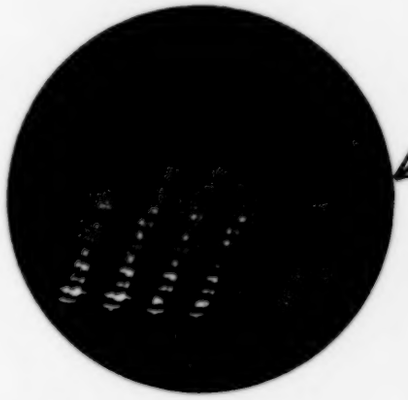
APPENDIX

TECHNOLOGY REVIEW, MASSACHUSETTS INSTITUTE OF TECHNOLOGY VOL. 72, pp. 18, 19, MAY 1970.



M.I.T.'s Walter D. Bilofsky uses a PDP-9 computer adapted for sound synthesis and analysis. He is shown using a program, of his own design, for the construction of a musical score, which the computer plays using sounds designed with the help of a second, sound-specification, program. At right is the visual output of this program, which enables the composer to edit the characteristics of his chosen sound. (Photos: Don Estes)



La Machine Infernale

Music by Computers
Heinz Von Foerster, James W. Beauchamp, editors
New York, John Wiley & Sons, Inc., 139 pp., $14.95

Reviewed by
Stephen W. Smoliar
Department of Mathematics, M.I.T.

This book is a collection of papers and sample recordings presented at the 1966 Fall Joint Computer Conference in a session entitled "Computers in Music" organized by Heinz Von Foerster.